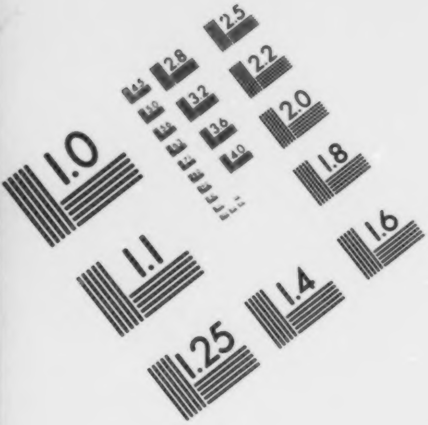
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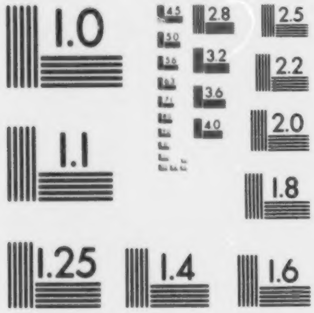
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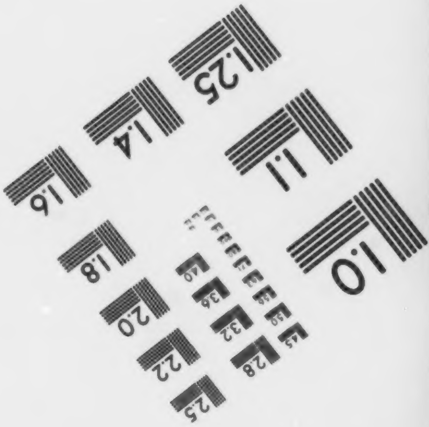
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Call to Action

Better Nutrition for Mothers, Children, and Families

December 6–8, 1990 • Washington, D.C.

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MCHING
Maternal and Child Health
Interorganizational Nutrition Group

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Call to Action

Better Nutrition for Mothers, Children, and Families

December 6–8, 1990
Washington, D.C.

Sponsored by:
Maternal and Child Health Bureau
Health Resources and Services Administration
Public Health Service
U.S. Department of Health and Human Services

In cooperation with:
Maternal and Child Health
Interorganizational Nutrition Group

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Foreword

The national workshop "Call to Action: Better Nutrition for Mothers, Children, and Families" provided an important and strategic opportunity for a large number of national organizations and agencies who impact on the health and nutrition of mothers, children, and families to focus on the improvement and promotion of their nutritional health and well-being. Well documented in recent publications —*Surgeon General's Report on Nutrition and Health* and the Institute of Medicine publication *Diet and Health*—and underscored in the *Healthy People 2000: National Health Promotion and Disease Prevention Objectives* related to nutrition, the quality of nutrition can have a significant effect on growth and development, prevention of disease, promotion and maintenance of health, and quality of life.

The workshop served as a forum for identifying current needs and issues in maternal and child nutrition services, reaching a consensus on priorities, developing key recommendations, and outlining specific actions and strategies which should be taken to implement the recommendations. Special emphasis was placed on fostering a collaborative approach to problem-solving and program development among agencies and organizations.

The leadership provided by the Maternal and Child Health Interorganizational Nutrition Group (MCHING) in organizing and planning the workshop will serve as an example for other national professional organizations and agencies who have substantial involvement in and potential for improving maternal and child nutrition services. The goals of MCHING—to develop and improve communication, exchange of information, and working relationships between key federal agencies and national organizations concerned with maternal and child nutrition, and to provide a forum to advocate for nutrition services for this population—can be supported and further strengthened if more organizations and agencies in the nation join hands in a collaborative effort.

These proceedings of the workshop provide an overview of the trends, needs, and issues in maternal and child nutrition services and present recommendations and action strategies to improve such services. It is hoped that the collaborative approach to problem-solving and program development in maternal and child nutrition demonstrated by MCHING and the workshop participants will serve as a model and further stimulate and support coordinated action at federal, state, and local levels. Improving the nutritional health of mothers, children, and families in the nation by improving the availability and quality of nutrition services accessible to them is the ultimate goal.

VINCE L. HUTCHINS, M.D., M.P.H.
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This workshop was made possible by a grant from the Maternal and Child Health Bureau (MCHB), Health Resources and Services Administration, Public Health Service, U.S. Department of Health and Human Services. The guidance of Vince L. Hutchins, director, E. Ann Prendergast, chief nutritionist, and M. Elizabeth Brannon, training program director, was instrumental in facilitating the workshop and preparing this publication. The advice and support they provided throughout the entire effort was greatly appreciated.

Deep gratitude is also expressed to the many individuals who generously participated in the planning and implementation of this workshop. The representatives of the member organizations of the Maternal and Child Health Interorganizational Nutrition Group (MCHING) who provided leadership, participated in planning meetings, and reviewed drafts of numerous documents contributed to the success of the workshop. The authors and reviewers of the workshop papers provided an excellent foundation for workshop discussions. The presentations of the workshop speakers and panel members provided helpful information and stimulated work group discussions. The 30 work group facilitators, recorders, and resource persons—identified on the workshop participants list—responded to their charge, assuring that the benefits of the workshop would be available to a broader audience.

Appreciation is expressed to the many organizations and agencies who selected and supported representatives to participate in the workshop, and to the workshop participants themselves who contributed their time, creativity, and enthusiasm to workshop deliberations and who will have a strategic role in following up on the recommendations and action strategies emanating from the workshop.

Heartfelt thanks is expressed to Mary C. Egan, MCH consultant, National Center for Education in Maternal and Child Health, who was the true architect and moving force behind this effort. The words from the title page "with the assistance of Mary C. Egan" do not adequately describe her vision and key leadership role in the organization of MCHING, the planning of the workshop, and the preparation and editing of this document.

Appreciation is also expressed to other colleagues at the National Center for Education in Maternal and Child Health for their enthusiastic support of MCHING. The nutrition staff, Susan Shapiro and Katrina Holt, contributed innumerable creative ideas for the development of the workshop, assisted with the proceedings, and provided staff support to MCHING. Paula Sheahan and Maureen Seller made a major contribution by attending to the many details of conference arrangements. The expertise of the publication staff—Carol Adams, copy editor; Dan Halberstein, primary designer; and Chris Rigaux, publications coordinator—is evident in this publication and the workshop-related materials. Many thanks are also due to Rochelle Mayer, program director, and Robert C. Baumiller, director, for their continuous support, leadership, and direction throughout the entire project.

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Executive Summary

Overview

The national workshop "Call to Action: Better Nutrition for Mothers, Children, and Families," held in December 1990, was an important part of the continuing efforts of the Maternal and Child Health Bureau, U.S. Department of Health and Human Services, to disseminate information about needs and issues in maternal and child health and to promote and support coordination among organizations and agencies at the national, state, and local levels which can impact upon the health of our nation's mothers, children, and families. With special emphasis on fostering a collaborative approach to problem-solving and program development, the workshop provided a forum for identifying current needs and issues in maternal and child nutrition services, reaching a consensus on priorities, developing key recommendations, and outlining specific actions and strategies which should be taken to implement the recommendations. Forty-four voluntary, professional, educational, and nonprofit organizations, and 14 federal agencies, sent representatives to the workshop. The representatives had an active interest in maternal and child health (MCH) and nutrition, and had demonstrated leadership roles in their organizations and agencies.

Leadership in the planning and implementation of the national workshop was provided by the Maternal and Child Health Interorganizational Nutrition Group (MCHING). The group includes representatives of the following national professional organizations, which have substantial involvement in and potential for improving maternal and child nutrition services: the American Dietetic Association, the American Public Health Association, the Association of Faculties of Graduate Programs in Public Health Nutrition, the Association of Maternal and Child Health Programs, the Association of State and Territorial Public Health Nutrition Directors, the National Association of WIC Directors, and the Society for Nutrition Education. The goals of MCHING are to develop and improve communication, exchange of information, and working relationships among key federal agencies and national organizations concerned with maternal and child nutrition, and to provide a forum for advocacy for nutrition services for the MCH population.

This summary briefly describes the foci of the 14 background papers prepared by invited authors for the workshop, discusses highlights of presentations given by speakers and panelists, and presents the recommendations and strategies for action developed by workshop participants.

Workshop Background Papers

The background papers provide a historical perspective on nutrition services in maternal and child health, give an overview of trends and issues in maternal and child nutrition, and discuss some specific action steps needed to improve nutritional health of mothers, children, and families.

A Historical Perspective. Four themes underlying the evolution of nutrition services in maternal and child health in the United States are discussed in "Nutrition Services in the Maternal and Child Health Program: A Historical Perspective." These themes are the cyclic nature of development, the parallel development of

MCH nutrition services and the broad MCH program, the interrelatedness of events or the ripple effect, and the influence of the social, economic, and political climate of the times. Over time changes in the programmatic and administrative aspects of nutrition services have included changes related to the focus/emphasis, organizational locus, methods of delivering nutrition services to the MCH population, sources of funds, and training of nutrition personnel for MCH services. Among the recurring issues in maternal and child nutrition services are: the adequacy and quality of the assessment of nutrition needs and problems as a basis for planning and action in nutrition services in MCH programs; the organization and financing of nutrition services; the need for improved coordination and collaboration among all concerned with nutrition services; the training of health practitioners in the science of nutrition and its application to health care; and the transfer and application of nutrition research in order to improve practice. Some of the important characteristics of each decade and milestones which influenced the development of MCH nutrition services are summarized.

Societal Trends. The background paper "Societal Trends That Affect Nutrition Status and Services for the Maternal and Child Health Populations" identifies some of the broad socioeconomic, demographic, health, nutrition, technological, legislative, and political trends that affect nutrition status and services for the MCH population. It is expected that the MCH population will remain large in absolute size; become increasingly culturally diverse with a growing number of black, Hispanic, and Asian children; and remain predominantly urban. High rates of childhood poverty will create a continuing need for MCH nutrition services and monitoring of nutrition status. The tremendous expected growth in female employment (specifically maternal) may lead to institutions other than the family becoming more responsible for some or all of children's meals, and thus they will become an important group to reach with nutrition education.

Trends related to health and nutrition—such as the increasing prevalence of chronic illness and disability in children, the compromised nutrition status of many children, the continued presence of hunger, inadequate health insurance coverage, and the decreasing number of accessible health care providers—will also impact on nutrition services. Modern technology, especially in food processing and agricultural production, is creating changes in the availability, quality, composition, and safety of the food supply, and is also affecting the economics and complexity of the marketplace. When new information and mass communication technologies—which offer both health professionals and industry better ways to present and target their messages—are combined with the increasingly complex food supply industry, the impact on food consumption patterns can be both postive and negative. Among the legislative and political trends discussed are the lack of a comprehensive legislative effort to address poverty and social inequities which exist, the continuing conflict regarding values related to the role and status of women and families, and the negative impact of poverty and inflation on access to food programs.

Women's Nutrition for Optimal Reproductive Health. The paper "Women's Nutrition for Optimal Reproductive Health" considers nutrition goals during the reproductive years and circumstances which can prevent a woman from achieving nutritional well-being. The need for a focus on maternal nutrition, particularly individualized nutrition counseling for women during all phases of their reproductive years, is emphasized.

The paper presents current data related to energy and protein requirements, vitamin and mineral considerations, and dietary non-nutrients during pregnancy. The value of nutrition intervention programs for high-risk women is underscored by the review of several intervention study efforts undertaken to improve pregnancy outcome. Recent findings of the Institute of Medicine's Subcommittee on Nutritional Status and Weight Gain During Pregnancy, indicating that gestational weight gain has an important relationship to fetal growth and that the relationship appears to vary according to prepregnancy weight-for-height, have important implications for counseling by professional care providers and for the monitoring of weight gain throughout pregnancy. Attention was directed to the Institute of Medicine's recommendation that health care providers adopt and implement standardized procedures for obtaining and recording anthropometric measurements to serve as a basis for classifying women according to weight-for- height, for setting weight gain goals, and for monitoring weight gain over the course of pregnancy.

Attention to preconceptional issues such as underweight, obesity, micronutrient imbalance, substance use/abuse, and control of chronic disease can reduce the risk of adverse pregnancy outcome and significantly affect the course and outcome of pregnancy. In the postpartum period, the nutrition demands of lactation need attention, as do the weight reduction programs undertaken by some women to accelerate the rate of postpartum weight loss.

Infant Nutrition. The background paper "Infant Nutrition" emphasizes the critical role of nutrition in the first year of life, when nutrient requirements are higher because of rapid growth and development. Three general approaches to estimating nutrient requirements of infants are described, and their major shortcoming (the lack of functional end points which emphasize specified capacities or long- or intermediate-term health consequences) is noted.

Current issues in infant nutrition relate to growth patterns in breastfed infants, the mechanisms by which human milk constituents protect infants from acute infection, the declining incidence of breastfeeding, the effect of infant feeding choice on intermediate-term outcome, and the effect of iron and other nutrient deficiencies on functional abilities and health. Issues which require continuing attention include the limitations of the information base needed to further develop nutrition management protocols for low birthweight infants, the nutrition problems of infants with special health care needs and the difficulties encountered in screening and assessing them and providing indicated intervention, and the continuing prevalence of poor infant feeding practices. Although efforts have been made to improve the infant nutrition data base, limited data are available on the behavior and practices of child caretakers in relation to infant feeding and parenting, and on infant feeding practices in culturally diverse populations.

Child Nutrition. The background paper "Child Nutrition" stresses the importance of nutrition during childhood for adequate growth and for the maintenance of health. In addition to discussing nutrient requirements, the paper considers the developmental, cultural, and emotional needs of children that must be taken into account in planning their food intake.

Common nutrition problems among children—obesity, failure to thrive, iron deficiency anemia, and dental caries—can have significant short- and long-term consequences. The most common effects related to childhood obesity are psychosocial, including disturbed family interactions, peer disapproval, academic discrimination, low self-esteem, and poor body image. Children who suffer from failure to thrive are at risk for lasting deficits in growth, cognition, and socioemotional functioning. The physiological effects of impaired iron status and the association between iron deficiency anemia and suboptimal behavior, as demonstrated by lower scores on tests of development, learning, and school achievement, are of concern, as are dental caries which affect 98 percent of all American children. Dietary and lifestyle interventions in childhood to prevent chronic diseases in adulthood deserve more attention.

The model proposed for nutrition services for children includes problem identification by screening every child to identify those at highest risk and then by providing a more detailed assessment by a nutritionist for those children found to be at risk. Four basic approaches to intervention are suggested—health promotion, risk reduction, disease treatment and control, and rehabilitation. The final steps of the model include follow-up and evaluation to assess accomplishments and outcomes.

Inadequate nutrition services in day care programs, lack of participation in and coverage of child nutrition programs, nutrition gaps in school health services and school-based clinics, and the need for greater focus on nutrition services for children with special developmental and health needs are among the child nutrition issues of concern. Integration of nutrition services into all aspects of child health care, and into day care policies and school health services, is stressed.

Adolescent Nutrition. The major nutrition-related issues and concerns of youth today, and the nutrition services needed by youth, are reviewed in "Adolescent Nutrition: Trends and Critical Issues for the 1990s." The limitations in the available data on nutrient requirements that correlate with biological events during puberty are noted. For many nutrients, recommended allowances are based on extrapolations from adult or child studies.

Groups of adolescents at highest risk for undernutrition and inadequate food intake are low-income youth, youth with chronic illnesses and handicapping conditions, heavy alcohol or drug abusers, youth in families where the primary caretaker is drug- or alcohol-dependent or mentally ill, pregnant teenagers, and chronic dieters. The actual number of adolescents at nutritional risk cannot be quantified because the consistent and ongoing monitoring of data on the health status of adolescents are extremely limited at both state and national levels.

Inadequate nutrition during adolescence may retard or stunt linear growth, lower resistance to infections and disease, impair learning ability and performance, and adversely affect the ability to function at peak physical capacity. Underweight pregnant adolescents are at risk for delivering low birthweight infants, and those who enter pregnancy in poor nutritional health with low nutrient reserves may have poorer pregnancy outcomes. Adolescents who have chronic illnesses and are undernourished may have a diminished quality of life and shorter life span.

Nutrition issues among adolescents include obesity, chronic dieting, eating disorders, atherosclerosis during adolescence, and dental caries. There is concern that certain dietary habits among adolescents—particularly dietary excesses involving calories, sugar, fat, cholesterol, and sodium, common among adolescents in all income and ethnic groups—may continue into adulthood. Nutrition misinformation related to nutrition and sports is common, and the need for nutrition education for teachers, coaches, trainers, adolescents, and health professionals working with youth and parents is underscored. Recommendations are made for nutrition services in health care settings for adolescents, school-based nutrition education programs, the strengthening and improvement of school food services for adolescents, and parent and family involvement in nutrition education efforts.

Children with Special Health Care Needs. The paper "Children with Special Health Care Needs" describes the nutrition concerns and nutrition service needs of infants, children, and youth with, or at risk for, physical or developmental disability, or with a chronic medical condition caused by or associated with genetic/metabolic disorders, birth defects, prematurity, trauma, infection, or perinatal exposure to drugs. These children, who make up approximately 10–15 percent of the pediatric population, are often at risk for inadequate nutrient intake, impaired nutrient absorption or utilization, or increased nutrient excretion. The developmental needs of children with special health needs may also differ substantially from those of other children. Developmentally delayed children may not progress normally in reaching the milestones leading to independence in feeding.

Assessing and meeting the nutrition needs of children with chronic disabling conditions or illnesses is complex, and the need for individualized nutrition care planned by a qualified nutritionist/dietitian and involving input from an interdisciplinary team is stressed. Growth retardation, altered energy and nutrient requirements, and drug-nutrient interactions are nutrition concerns in children with special health care needs. In addition, feeding problems and eating disorders with multiple etiologies (e.g., structural defect and/or neuromuscular dysfuntion, developmental delay) can lead to nutrient inadequacy or failure to thrive, and can cause serious disruption in the daily life of the child's family. These complex conditions require individualized nutrition management that meets the emotional and functional needs of the child and family.

Clinical nutrition services for these children could be strengthened by implementing the use of appropriate nutrition screening and referral tools to identify and refer children at risk, and the use of standardized protocols to assure the quality of nutrition screening, assessment, intervention, and monitoring services. Linkages with community programs which can contribute to a comprehensive, coordinated, community-based, family-centered system of care should be expanded, and effective referral mechanisms between tertiary care centers and community-based providers should be developed. School food services should strive to better meet the needs of these children.

The authors identify the competencies critical to effective nutrition/dietetic practice with children with special health needs. There is a need to upgrade the knowledge and skills of dietitians/nutritionists in the nutrition-related aspects of services for special needs children, and to increase the numbers of dietitians/nutritionists who have this training. Undergraduate and graduate nutrition programs should include content and/or field experiences which address the needs of such children, and inservice and continuing education opportunities should be expanded.

New legislation, a changing population of children, home health care, high technology treatment, multiagency involvement, and the focus on family-centered, community-based delivery of services have resulted in new opportunities for providing nutrition services in the context of comprehensive health care. Nutrition services available for children with special health needs could be strengthened and expanded by improving the documentation of need, resources, and procedures for such services; expanding access to nutrition services in all settings serving such children, including home health care programs; identifying funding sources to reimburse for nutrition services; and increasing the availability and use of nutrition personnel experienced in chronic illness and developmental disabilities for policy-making, planning, program development, and provision of community-based services through local, state, and federal health, education, and vocational agencies.

Seven additional background papers address the administrative aspects of the delivery of nutrition services.

Needs Assessment, Planning, Implemention, and Evaluation of Nutrition Services. "Needs Assessment for Nutrition Activities in Maternal and Child Health," "Planning, Implementing, and Evaluation of Nutrition Programs," and "Components of Nutrition Services" describe the systematic process for designing and implementing innovative, effective, and efficient nutrition programs.

The value of needs assessment, the first step in the planning process, in establishing priorities is emphasized so that resources and services are targeted toward those individuals or groups whose needs are the greatest and for whom it is most likely that identified problems can be resolved. Mechanisms suggested for overcoming barriers which may prevent the more widespread use of needs assessment in nutrition program planning include strengthening and expanding the collection of monitoring and surveillance data relevant to the MCH population; developing a manual on how to conduct needs assessment in maternal and child nutrition as part of the nutrition program planning process; providing adequate resources to conduct a needs assessment and for planning and evaluating outcomes; and improving the content of both graduate and continuing education training programs related to needs assessment for public health personnel.

The importance of involving nutritionists in policy planning and implementation planning is emphasized. Organizational priorities are established and programs are selected through policy planning. Implementation planning results in the design of intervention strategies expected to be effective because of their basis in science and market research. Advantages of collaborative planning by providers, clients, advocates, and related constituencies in the service network include avoiding duplication and assuring that limited resources are efficiently used. Information is presented on steps in the planning process—setting priorities, goals and objectives, analysis of alternatives, design of interventions, managing implementation, and evaluation. The need to develop uniform management information systems for nutrition services, and to improve the selection and application of evaluation methodology tailored for specific management purposes, is highlighted.

The specific components of nutrition services—screening for nutrition problems, assessment of nutrition status, and planning and implementation of nutrition care—that need to be carried out in a systematic manner in all health care programs are described. Guidelines which define all of the components of nutrition services, how they are to be provided to individual clients, and qualifications of providers of those services should be established in all health care programs.

Quality Assurance. The paper "Quality Assurance" outlines approaches to measure and monitor the quality, efficiency, and effectiveness of nutrition care. The importance of establishing guidelines which define each component of nutrition services, and of improving the documentation of nutrition services and their outcomes, is emphasized. There is a need to standardize the methodology for quality assurance, update existing quality assurance criteria, and formulate criteria for newer high-risk conditions such as maternal and pediatric HIV infection and drug abuse.

Personnel. "Personnel for Delivery of Nutrition Services" describes the various health professional and paraprofessional personnel who are qualified to provide nutrition care for mothers and children in health care settings and their roles, responsibilities, and training. The major roles of the public health nutritionist are assessing the community and its population; policymaking; planning and evaluating; and coordinating, consulting, educating and managing nutrition services for a community. The direct care nutritionist usually works on a one-to-one basis and counsels patients, caregivers, teachers, and children about appropriate diet for optimum growth and development.

In addition to public health nutrition personnel and registered dietitians, the role of other health personnel (e.g., physicians and nurses) who arrange for or provide nutrition care for mothers and children in the community should be recognized. Among issues related to the use of other health personnel are the quantity and quality of their training in MCH nutrition and their level of understanding of the role and contributions of qualified nutritionists and dietitians in health services for mothers, children, and families.

Physicians, nurses, and teachers need much more preservice and inservice education in nutrition, as well as continuing consultation from a qualified nutritionist, if they are to participate actively in the delivery of nutrition services for mothers, infants, and children. The importance of implementing standards for MCH nutrition in the curriculum of educational programs for physicians, nurses, and other health practitioners is emphasized.

Data are presented which indicate that about 2,000 public health nutritionist positions are budgeted in state and local public health agencies. It is estimated that this is less than one-half of the number needed. In addition to insufficient numbers and maldistribution of qualified public health nutritionists, other major issues concerning nutrition personnel in public health agencies are the overdependence of official health agencies on a single funding source, primarily the WIC program, which serves only WIC-eligible pregnant, postpartum and lactating women, infants, and children up to age 5; and the need to improve the availability and utilization of other funding sources (e.g., MCH Block Grant, Medicaid, and P.L. 99–457) to support nutrition services for the MCH population. Among problems facing maternal and child health programs is the lack of availability of both public health nutritionists and direct care nutritionists to provide services for preconceptional health care, for women (pregnant, postpartum or lactating), infants and children who are not eligible for WIC; and for such programs as child day care, school health, adolescent health, and children with special health care needs.

Financing Nutrition Programs. "Financing Nutrition Programs" discusses obtaining and utilizing public and private funding sources for nutrition services, including grants, contracts, third-party reimbursement, and payments for products and services. Policymakers and nutrition providers should be better informed about funding resources available for nutrition services and how to access them, and about gaps in resources and how to overcome or fill them, including accessing third-party reimbursement from public and private insurance programs.

In recent years, reimbursement for nutrition services by public and private third-party payers has become an important source of financing for local nutrition services. While coverage varies from payer to payer and from state to state, sources for reimbursement for nutrition services for the MCH population include Medicaid/Early and Periodic Screening, Diagnosis and Treatment (EPSDT), Blue Cross/Blue Shield, Supplemental Security Income, state programs for children with special health care needs, workmen's compensation, and commercial carriers.

Recent changes in the Medicaid legislation have enhanced prenatal care services and expanded income eligibility for infants and pregnant women. At least 24 states provide Medicaid reimbursement for nutrition counseling to pregnant women. EPSDT provides another opportunity for reimbursemnent for nutrition services since EPSDT rules now require states to cover all services allowed under Medicaid to correct or ameliorate defects discovered by screening services. Since many policy decisions regarding reimbursement for nutrition services through Medicaid/EPSDT are now made at the state level, it is essential to work with state agencies to advocate for and take advantage of all possible resources for nutrition services.

Economic Analysis of Nutrition Care. The paper "Economic Analysis of Nutrition Care Within Maternal and Child Health Services" explores the economic information needs of decision-makers, reviews the process of policy analysis from the economic perspective, and discusses the relationships between a system of quality nutrition care and economic benefits. To strengthen the financing and economic analysis of nutrition services, the availability (documentation), use, and dissemination of nutrition-related cost data, including cost-effectiveness and cost-benefit aspects, should be improved. Since planners, providers, consumers, and payers all make choices about nutrition services, they need to be informed about the relationship of nutrition to the economic health of mothers and children. Nutrition professionals have an important role in interpreting and disseminating information learned from economic analyses.

Workshop Plenary Sessions

Speakers at the workshop with particular expertise in and knowledge of maternal and child health and collaboration among organizations stimulated participants to use a coordinated and cooperative approach to follow-up action.

The keynote address by the Honorable John D. Rockefeller IV set the tone for the conference and provided an overview of the major problems, needs, and trends in maternal and child health with some focus on the nutritional aspects. Senator Rockefeller noted that the benefits to children and families of prenatal care, proper nutrition, and access to basic health care

are well documented. He indicated that America must face the challenge to bring about the day when every child in this country has access to basic, affordable health care and when every pregnant women gets early prenatal care. The other necessary ingredients of good health for children must be provided—proper vaccinations, adequate nutrition, regular exercise, and a life that is free of tobacco, drugs, and other preventable and very real dangers. Mobilizing around the goals of reducing infant mortality and vastly improving child health, and working together to transfer our commitment and determination to political leaders, communities, and everyone else, are important, he said, underscoring the fact that the future of our nation depends on the health of our children.

Participants on a reaction panel discussed their views on the issues and recommendations presented in the workshop background papers. Frank Witter, representative of the American College of Obstetricians and Gynecologists, discussed the need to focus more attention on prenatal health care services in this country. He noted that there is widespread agreement that prenatal care is a major factor in the prevention of infant morbidity and mortality, is strongly and clearly associated with improved pregnancy outcome, and is cost-effective. He recommended that prenatal care not be viewed as just a medical examination, but rather as an opportunity for education in nutrition, wellness, and parenting skills. Breastfeeding promotion should also be an integral part of prenatal care. More research is needed, he urged, on the cost-effectiveness of prenatal nutrition services in order to establish additional mechanisms to pay for these services.

William Haskins, vice president of programs, the National Urban League, described the current disparity with respect to infant mortality rates and other indicators of health status among low-income and culturally diverse populations. He indicated that African Americans experience complex health disadvantages which are exacerbated by a combination of poverty, racial bias, ignorance, and lack of access to quality health care. During the next decade, the nation must face the challenge of providing affordable, high quality health care for all its citizens through the development of universal health care access reflective of the needs of unserved and underserved populations. He recommended that steps be taken to improve the nutrition and health of African Americans, including developing culturally specific educational programs to better inform the African American population of the importance of the special health problems it confronts and of measures that can be taken to improve its health; eliminating barriers to access to health care systems; and including an outreach component for all service delivery programs to assure the participation of African Americans.

A representative from the Federation for Children with Special Needs: CAPP National Parent Resource Center, Barbara Popper, presented the parents' perspective on nutrition services for mothers, children, and families. She stated that parents seek care that is family-centered, community-based, comprehensive, and delivered with cultural sensitivity and competence. They would like health care providers to be advocates for their children, and they want realistic, practical, and specific advice on nutrition that takes into account the appropriate setting for the delivery of services. They feel it is important to receive a consistent message about nutrition and health from all health care team members, and they are concerned about cost and about who will pay for nutrition services. She suggested that health care providers be encouraged to increase their efforts to involve parents in planning, coordinating, and evaluating the outcome of programs and services.

In the plenary session, "Building Coalitions," Lori Cooper, the executive director of Healthy Mothers, Healthy Babies, addressed the advantages of forming coalitions as a means of extending limited resources, exchanging or coordinating information, solving or monitoring problems, advocating for legislation, and/or putting on special events. She identified the steps in forming a coalition as: Conducting a needs assessment and a strategies assessment to identify an area of mutual need and to determine what has been done before; identifying all key individuals or organizations that should be included; defining the coalition's mission and setting clear goals; determining the best means of communication for the coalition; and clearly defining leadership roles and setting terms of service. She stressed that it is important to build in checkpoints to stop and identify what has been accomplished, what has been the cost, and what has changed as a result. If a coalition succeeds, do not be afraid to call it a success and disband it; but also do not be afraid to continue to explore the power of cooperation and collaboration in tackling new problems or aspects of the original problem around which the coalition formed.

In the plenary session "Dynamics of Change," David McCullum, deputy director at the Center for Risk Communication, Columbia University, promoted an integrated approach to changing eating behaviors that considers all factors that affect food choices. Organizations can join forces and captitalize on their combined energy and resources to identify gaps and coordinate efforts in policy and program development in nutrition services for mothers, children, and families, he noted. Organizations can advocate for nutrition programs for mothers, children, and families that are based on an integrated approach and that are self-sustaining. They can also advocate for legislation and regulations that promote good nutrition information to support consumer choices. Organizations can form coalitions with businesses to market healthy eating and healthy food products, and can recognize the power of the media and use it to promote their goals.

Accomplishments of the workshop and ways in which the goals and activities of their associations related to the implementation of the work groups' recommendations were discussed by members of a panel, Organizations and Opportunities for Action. They challenged the participants to take leadership roles in their organizations to implement recommendations and to support an integrated approach to problem-solving and program development in maternal and child nutrition. The following points were suggested by each panel member.

Nancy Wellman, representative from the American Dietetic Association, described the current association activities which offer opportunities for implementing many of the workshop recommendations. She explained that through its Alliance Program, ADA is actively working to strengthen its ties with other associations. ADA's Division of Government Affairs works on legislation affecting mothers and children. Its committee on Nutrition Services Payment Systems is developing guidelines for reimbursement for nutrition services. The network of ADA members who serve as media spokespersons provides a mechanism to communicate information on maternal and child nutrition to the public. ADA's position statements on maternal and child health issues provide a vehicle to influence policy and service delivery, and its standards for academic training and practice in clinical nutrition, food service management, and commuity dietetics improves the quality of MCH nutrition service. Through its annual meetings, workshops, the *Journal of the American Dietetic Association*, other continuing education publications, and the 22 practice groups related to specialty areas, ADA has many mechanisms for providing continuing education and for commuicating with its membership. The ADA representative indicated that the association will study the workshop recommendations and strategies for action and will explore opportunities to join with other organizations for action on behalf of mothers and children through better nutrition.

Richard Nelson, the president of the Association of Maternal and Child Health Programs, whose membership includes directors of state agencies who administer the Title V maternal and child health activities, encouraged organizations to become involved in state MCH planning as a means of implementing the workshop recommendations. He noted that the 1989 legislative changes in the Title V program give new emphasis to the role of state programs in assuring that a system of services appropriate to the health care needs of women and children is available and accessible. This assurance can include the recruitment of providers, the development or emphasis of standards of care to improve the quality of services, the identification of persistent or emerging needs for services, and the provision of services when those services would otherwise not be available. Since the nutrition of women and children is an integral component of their health, assuring access to nutrition services should be a component of a comprehensive system of health care services. The planning process for allocation of state maternal and child health resources involves establishment of spending or staffing priorities. If the priorities developed in this workshop related to improving nutrition services statewide are to be realized, he emphasized, organizations must participate actively in state MCH planning.

Terry Hatch, representative from the American Academy of Pediatrics' Committee on Nutrition, expressed the academy's commitment to the attainment of optimal physical, mental, and social health for all infants, children, adolescents, and young adults. He noted that members of the academy participate in activities related to professional education, advocacy for children and youth, public education, and research at the local, state, and national levels. There are many recommendations from this workshop, he promised, that AAP will review in looking for opportunities to collaborate with other organizations in implementing strategies for action. Access to medical care, advocacy for breastfeeding, the training of health professionals, promotion of interdisciplinary care, and increasing the involvment of consumers in the planning and development of programs and services are among the issues the academy continues to support. He concluded by saying that AAP looks forward to responding to the opportunities presented to improve nutrition services for the MCH population.

Recommendations and Strategies for Action

Interactive work group sessions were organized to give participants an opportunity to learn more about the missions, programs, and activities of the organizations represented and to reinforce the need for and advantages of integrated and collaborative action. Each work group focused on a major area of MCH nutrition; deliberated on the needs, issues, and recommendations outlined in the background papers; and identified additional ones for consideration. From this composite list, up to six priorities were selected, and specific action steps or strategies to address them were outlined. Organizations and agencies which should be involved in implementation were also identified. During a plenary session, the workshop participants had an opportunity to react and to comment on the selected priorities and action steps from the work groups.

The priority recommendations and strategies for action resulting from the work group sessions and plenary sessions follow. The first set of recommendations and action strategies, categorized as "crosscutting," includes those recommendations which were more generic, were identified by several work groups, and appeared to have implications for several groups of the MCH population. The other recommendations and action strategies are categorized according to the major areas of maternal and child nutrition services. Although the recommendations and strategies for action are numbered to assist in identification, the numbering system does not represent ranking of importance. Listed at the end of each category are the additional needs, issues, and recommendations which were identified by the work groups for which no strategies for action were developed.

Throughout this document, the term *nutrition services* refers to services which include screening, assessment, counseling, education, and referral to food assistance programs and appropriate community resources, as well as the administrative aspects of program planning and evaluation. The term *MCH population* includes all women of reproductive age, infants, children, and adolescents, including children with special health care needs due to chronic or disabling conditions. The recommendations and strategies for action should be considered in the context of families, communities, and resource implications. Implementation of strategies for action should be culturally competent and sensitive, and should involve the client's family as well as representatives of target populations.

The recommendations and strategies for action generated at this workshop will be disseminated in both the public and the private sectors to stimulate interest and to support collaborative planning and cooperation from all who can make a difference in the nutrition of mothers, children, and families. It is envisioned that organizations and agencies will "join hands" in collaborative efforts to implement recommendations and strategies identified at this workshop and promote a coordinated and cooperative approach to policy and program development in maternal and child nutrition.

Crosscutting Recommendations

Recommendation 1

Aggressively support nutrition services as an essential component of emerging national health care plans.

Strategies for Action/ Organizations and Agencies with Potential for Collaborative Action

1.1 Define a package of nutrition services which should be part of any national health care plan for children, adolescents, and adults. →

1.2 Base recommendations on cost-benefit studies of nutrition services and related research as much as possible. Disseminate cost-benefit information to key individuals and groups involved in developing national health care plans. →

1.3 Circulate the proposed package to any and all interested nutrition groups for endorsement. →

1.4 Meet with all organizations known to be working on national health care plans, including AAP, AMA, Physicians for National Health Insurance, and others. →

1.5 Meet with staff and members of appropriate congressional committees: the House of Representatives Committees on Ways and Means and Energy and Commerce, and the Senate Committees on Finance, Education, and Labor. →

1.6 Meet with appropriate staff in the executive branch, especially DHHS/HCFA. →

1.7 Meet with other appropriate organizations to participate in discussions related to national health care plans.

→ AAFP, AAP, ACOG, ACPM, ADA, AFGPPHN, AMA, AMCHP, APA, APHA, ASTHO, ASTPHND, ICEA, NAPNAP, NAWD, NGA, Physicians for National Health Insurance, SNE, Washington Business Group on Health, and other appropriate organizations that will participate in discussions related to national health care plans, including major corporations, labor unions, university health policy departments, the Employee Benefit Research Institute, the National Leadership Commission, the National Health Care Campaign, the Committee for National Health Insurance, and HIAA

Recommendation 2

Enhance financial resources available to support nutrition services for women of reproductive age, infants, children, and adolescents.

Strategies for Action/ Organizations and Agencies with Potential for Collaborative Action

2.1 Improve coverage of nutrition services in public/private agencies at national, state, and local levels by identifying and advocating for sources of funding, and by educating current and prospective providers and payers of nutrition services about the value of nutrition providers and the benefits of nutrition services.

→ AAFP, AAMR, AAP, AAUAP, ADA/Nutrition Services Payment Committee and relevant practice groups, AFGPPHN, AMCHP, and ASTPHND

Recommendation 2 (Cont'd)

2.2 Convene a task force of national organizations representing the providers of nutrition services to review current payment policies covering nutrition services on a state-by-state basis, identify priority needs for payment of nutrition services, and develop a report which can be distributed to states for their use in advocating for financial resources. →

2.3 Provide training for nutritionists and other health care providers on sources of payment and successful billing methods. →

2.4 Encourage nutrition providers to take steps to obtain Medicaid and insurance payments for nutrition services, including intensive nutrition counseling provided by qualified professionals. →

2.5 Establish advocacy programs and advocacy training for nutrition service providers to generate appropriate payment for nutrition services (using AAP and ADA advocacy models). →

2.6 Promote more collaboration between state health and welfare agencies in order to improve the use of resources and quality of services. →

2.7 Revise the policy regarding payment of EPSDT services to include administrative costs of planning, consultation, and training for nutrition services and disseminate to health care providers. →

2.8 Inform all health care providers about the current EPSDT regulations which allow payment for treatment, such as nutrition counseling for diagnosed conditions. →

2.9 Explore the possibility of accessing Medicaid funds for oral rehydration therapy. →

2.10 Encourage the integration of early nutrition intervention services into P.L. 99-457–funded programs, and develop strategies for improving access to these funds for nutrition services for families of children with special health care needs.

→ ADA, AFGPPHN, AMCHP, APHA, ASTPHND, DHHS/HCFA and MCHB, HIAA, NGA, NAWD, and SNE

2.11 Analyze existing data, encourage more research on cost-effectiveness and cost-benefit analysis of nutrition services, and disseminate data to policymakers.

→ ADA, AFGPPHN, AMCHP, APHA, ASTPHND, DHHS/HCFA/Office of Research and Demonstrations and MCHB, NAWD, and SNE

Recommendation 3

Increase the availability and accessibility of comprehensive nutrition services, including nutrition education, that are family centered, culturally sensitive, and developmentally appropriate for all women of reproductive age, infants, children, adolescents, and families.

Strategies for Action/ Organizations and Agencies with Potential for Collaborative Action

3.1 Request federal and state agencies, industry, insurers, and other funding sources to make funds available to assure that nutrition services are an integral part of their programs. This would include support for training, consultation, monitoring, and program development. →

3.2 Develop a national strategy and public/private/voluntary partnerships to implement this recommendation.

➡ ADA, AFGPPHN, AMCHP, APHA, ASTPHND, DHHS/MCHB, NACHC, NAWD, SNE, USDA/FNS and the Cooperative Extension Service, and representatives of industry including the insurance industry

3.3 Improve access to care by simplifying and standardizing eligibility applications for services, including WIC, Food Stamps, and Medicaid.

➡ DHHS/HCFA and MCHB, NAWD, NASW, and USDA

3.4 Mobilize coalitions to advocate for funding for comprehensive nutrition services.

➡ ADA, AFGPPHN, AMCHP, APHA, ASTPHND, HMHB, ICEA, NAWD, and SNE

3.5 Advocate for more MCHB nutrition leadership positions at the federal (MCHB and regional offices) level and also in state health departments; provide for increased nutrition consultation; and encourage nutritionists to participate in the MCH Leadership Institute.

➡ ADA, AFGPPHN, AMCHP, APHA, ASTPHND, HMHB, NAWD, and SNE

3.6 Pilot some approaches for developing a community-based nutrition program which targets women of reproductive age, infants, children, and adolescents at greatest risk. Such approaches should consider needs assessment, program development, implementation, and evaluation.

➡ ADA, AFGPPHN, AMCHP, APHA, ASTPHND, DHHS/MCHB, NACHC, NAWD, SNE, USDA/FNS and the Cooperative Extension Service, and representatives of industry including the insurance industry

3.7 Expand nutrition status monitoring efforts to other settings such as Head Start, schools, and early intervention programs.

➡ ADA, AFGPPHN, AMCHP, APHA, ASTPHND, DHHS/MCHB, NACHC, NAWD, SNE, USDA/FNS and the Cooperative Extension Service, and representatives of industry including the insurance industry

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Recommendation 4

Increase the number and improve the quality of personnel (professional and paraprofessional) providing nutrition services.

Strategies for Action/ Organizations and Agencies with Potential for Collaborative Action

4.1 Disseminate information about the shortage and maldistribution of personnel providing nutrition services to a broad range of organizations, agencies, and groups such as key congressional committees concerned with health resources and access to care, ADA, AFGPPHN, AMCHP, APHA, ASTPHND, ASTHO, ATMCH, NACHC, NAWD, the National Health Council, and consumer groups such as the Center for Black Women's Wellness, and the Federation for Children with Special Needs—CAPP National Resource Parent Center.

➡ AFGPPHN, ASTPHND, DHHS/BHP and MCHB

4.2 Continue the surveys supported by federal agenices, national professional organizations, and others regarding the numbers and distribution of qualified professionals providing nutrition services.

➡ AFGPPHN, ASTPHND, DHHS/BHP and MCHB

Recommendation 4 (Cont'd)

4.3 Implement standards for MCH nutrition in the curricula of educational programs for physicians, nurses, health educators, health administrators, public health nutritionists, registered dietitians, dietetic technicians, childbirth educators, and other professionals and paraprofessionals who will be involved in nutrition care delivery. The curricula should address the need for improved nutrition counseling skills and development of more effective educational strategies and materials for women, children, and adolescents from varied ethnic, class, regional, and age backgrounds, and should include training in social and behavioral sciences.

→ AAFP, AAMC, AAP, AAUAP, ABMS, ACNM, ACOG, ADA, AHA, AHEA, AIN, AMA, ANA, APHA, ATMCH, Center for Black Women's Wellness, COSSMHO, DHHS/IHA, MCHB, and NIH/Office of Research on Women's Health, ICEA, La Leche League, Migrant Resource Program, MDBDF, NAACOG, NASW, NAWD, NLN, NUL, SFAA, SNE, SOPHE, and USDA

4.4 Provide more incentives to attract and recruit students, increase minority representation, and retain employees in careers in nutrition and dietetics. Increase awareness of the need to take advantage of existing alternate routes to certification/registration of nutrition professionals. Efforts should be made to enhance salaries of those working in public health settings, develop expanded career ladders for professionals and paraprofessionals, and investigate other ways to attract and recruit students and retain them in the profession.

→ ADA, AFGPPHN, AHEA, AMCHP, APHA, ASTPHND, NAWD, and SNE

4.5 Expand and/or revise graduate training programs in public health nutrition to reflect changing needs, and implement an "approval or certification" mechanism which can be used to identify and certify such programs.

→ AFGPPHN, CEPH and DHHS/MCHB

4.6 Increase the number of MCHB-funded training programs and continuing education opportunities, particularly in geographic areas without them. Expand the number of clinical nutrition programs funded by the National Institutes of Health.

→ ADA, AFGPPHN, AMCHP, APHA, ASTPHND, NAWD, and SNE

4.7 Establish faculty qualifications and funding mechanisms to support faculty of graduate training programs in public health and MCH nutrition. This should include funding opportunities to maintain direct public health agency experience, upgrade training of MCH faculty in nutrition, train new faculty, and support public health experience for current faculty.

→ ADA, AFGPPHN, AMCHP, APHA, ASTPHND, ATMCH, DHHS/MCHB, NAWD, and SNE

4.8 Develop and strengthen the training of health professionals in the area of public policy. Include the development of case studies and articles on nutrition policy for distribution to health care organizations and staff of public health training programs. Explore various means of disseminating such material (e.g., through the network of the Washington Business Group on Health).

→ ADA, AFGPPHN, ASTPHND, DHHS/MCHB, NAWD, and SNE

4.9 Design, test, and evaluate varied approaches to public health nutrition training, with emphasis on off-campus/satellite programs to reach current practitioners.

→ AFGPPHN, ASTHO, ASTPHND, ATMCH, DHHS/BHP and MCHB

Recommendation 5

Educate and train all health care providers, both professional and paraprofessional, working with or planning to work with pregnant women, infants, children, adolescents, and families on sound infant and child feeding practices, including breastfeeding.

Strategies for Action/ Organizations and Agencies with Potential for Collaborative Action

5.1 Assess the content of curriculum as well as of registration and licensure examinations for appropriate infant and child feeding practice information, including information on breastfeeding. Develop ways in which such information can be incorporated into the curricula and credentialing of health care professionals (e.g., pediatricians, nurses, dietitians, nurse midwives, obstetricians, family practitioners, and nurse practitioners).

➡ AAFP, AAP, ACNM, ACOG, ADA, AFGPPHN, AHA, AHEA, APHA, DHHS/MCHB, MDBDF, NAACOG, NAWD, and USDA

5.2 Increase the number and availability of short-term training courses for registered dietitians and other providers involved in nutrition services for high-risk infants and children. Such courses should provide specialized breastfeeding and infant and child feeding guidelines for those at high risk.

➡ AAFP, AAP, ACNM, ACOG, ADA, AFGPPHN, AHA, AHEA, APHA, DHHS/MCHB, MDBDF, NAACOG, NAWD, and USDA

5.3 Develop ongoing nutrition training and provide appropriate educational materials relating to breastfeeding, and infant and child feeding guidelines, to child care centers, family day care homes, foster care providers, and maternity homes.

➡ AAP, ADA, AFGPPHN, AMCHP, APHA, ASTPHND, ASTHO, DHHS/MCHB, ICEA, NAWD, SNE, USDA, and state health and welfare agencies

Additional Crosscutting Recommendations

- Improve the comprehensiveness and quality of maternal and child health nutrition services by establishing and validating standards for qualifications and for numbers and ratios of nutrition personnel required to deliver quality nutrition services; developing nutrition standards of practice for early intervention services; and recognizing that the family is the constant in the child's life and including the parent as a respected partner in any team serving the family.
- Improve needs assessment in maternal and child health services by identifying barriers in the needs assessment process, including cultural and language issues; including children with special health care needs in national nutrition monitoring and other state and national data systems; and improving data bases, paying special attention to specific examples related to infant morbidity and mortality.
- Inform policymakers, providers, and families about funding resources available for nutrition services and how to access them, and about gaps in resources and how to overcome or fill them, including accessing third-party reimbursement from public and private insurance programs.
- Improve the capacity for delivery of local nutrition services by providing additional resources (e.g., personnel, facilities, educational materials).
- Incorporate oral health in a specific way in all aspects of nutrition care; promote fluoridation of water.
- Encourage nutritionists to be involved in policy planning of maternal and child health at the state level.
- Provide methods of improving the use of nutrition services (marketing, behavioral modification, etc.).
- Explore ways to address and modify the role of the media in determination of food consumption.
- Recognize the family as the focus of change and emphasize settings in which the family is the focus of nutrition services.

Recommendation 6

Increase awareness of the importance of preconceptional care among all health care providers and among all women of child-bearing age. Give more emphasis in health care delivery to preventive approaches throughout the preconceptional period in order to optimize women's nutritional reserves and well-being, reduce nutrition risk factors, and support optimal pregnancy outcomes.

Strategies for Action/ Organizations and Agencies with Potential for Collaborative Action

6.1 Develop recommendations for the nutrition component of preconceptional care. These recommendations should specifically mention the importance of nutrition assessment, including weight and height monitoring at all health care encounters.

➡ AAFP, AAP, ACNM, ACOG, ADA, ANA/MCH Division, ASCN, DHHS/MCHB and NIH, NAACOG, SAM, and USDA/FNS and HNIS

6.2 Disseminate these recommendations to all professionals who provide health care to women of child-bearing age, and support their efforts to educate women about the importance of nutrition as a component of preconceptional care.

➡ AAFP, AAP, ACNM, ACOG, ADA, ANA/MCH Division, APHA, DHHS/MCHB, HMHB, ICEA, NAACOG, SAM, USDA/HNIS, and other groups responsible for the education of health professionals

6.3 Develop a record for the client to carry to enable her to share information about her nutritional status with all of her health care providers.

➡ Committee on Nutritional Status During Pregnancy and Lactation/IOM/NAS

Recommendation 7

Provide all pregnant and lactating women with access to appropriate, acceptable, and family-centered nutrition services as basic components of perinatal care. Emphasis should be given to providing incentives and using practical approaches which encourage continuous participation in health care.

Strategies for Action/ Organizations and Agencies with Potential for Collaborative Action

7.1 Support and advocate for the funding of WIC at a level which assures the availability of food supplementation and nutrition education to all WIC-eligible pregnant and postpartum women.

➡ AAP, ACOG, ADA, AMCHP, APHA, ASTPHND, FRAC, NASW, and NAWD

7.2 Advocate and provide support for Medicaid to include nutrition counseling and education as reimbursable services and to provide for nutrition counseling and education for pregnant women. These nutrition services should extend for one year postpartum.

➡ AMCHP, ASTPHND, DHHS/HCFA and MCHB, HMHB, NASW, NAWD, and the Medicaid Technical Advisory Group

7.3 Support and advocate for adequate Title V MCH block grant funding for the

Recommendation 7 (Cont'd)

employment of state and local public health nutrition staff to provide nutrition counseling for pregnant and postpartum women.

➡ ADA, AFGPPHN, AMCHP, APHA, ASTHO, ASTPHND, DHHS/MCHB, HMHB, NACHC, NAWD, and SNE

7.4 Promote and support the availability of health insurance or other means necessary to ensure access to comprehensive health care for all women. Payment for nutrition services should be available through all health insurance plans.

➡ ADA, AFGPPHN, AMCHP, APHA, ASTPHND, DHHS/HCFA, NAWD, and industry and labor groups

7.5 Advocate for food stamp benefits to be based on the Low-Cost Food Plan rather than the Thrifty Food Plan.

➡ ADA, ASTPHND, APHA, Bread for the World, FRAC, NASW, and SNE

7.6 Advocate for eligibility for public assistance (e.g., Aid to Families with Dependent Children and general welfare) to be at or greater than 100 percent of the federal poverty level.

➡ ADA, AFGPPHN, AMCHP, APHA, ASTPHND, CSWE, HMHB, MDBDF, National Commission on Children, National Commission on Infant Mortality, NASW, and NAWD

7.7 Initiate and implement incentive programs that involve participants and encourage the continuing use of nutrition services and perinatal care by providing coupons, child care, transportation, skill development, a user-friendly environment, and the like.

➡ DHHS/MCHB, State Title V Programs, and community-based organizations

Recommendation 8

*Promote breastfeeding among all women to achieve the Year 2000 National Health Promotion and Disease Prevention Objectives for breastfeeding, and establish breastfeeding as the societal norm for infant feeding.**

Strategies for Action/ Organizations and Agencies with Potential for Collaborative Action

8.1 Promote breastfeeding as the preferred method of infant feeding to the memberships of all health professional organizations.

➡ AAP, ACNM, ACOG, ADA, AHA, APHA, ASTPHND, DHHS, ICEA, La Leche League, NAWD, and USDA

8.2 Continue efforts to develop more effective strategies to promote breastfeeding through hospitals, MCH programs, WIC and other food assistance programs, industry, and other worksites, including federal agencies.

➡ AAP, ACNM, ACOG, American Dental Association, ADA, AHA, APHA, ASTPHND, AMCHP, ATMCH, DHHS, NAWD, SNE, USDA, and labor and industry organizations

8.3 Explore ways to promote breastfeeding through community programs, such as the EFNEP, food stamps, and other community-based interventions.

➡ DHHS and USDA (all appropriate units)

** Recommendation 8 is repeated under Infant Nutrition as Recommendation 11.*

8.4 Encourage federal agencies to serve as models for providing support of breastfeeding women in the federal worksite.

→ ADA, AGFPPHN, AMCHP, APHA, ASTPHND, DHHS (all appropriate units), NAWD, SNE, and USDA (all appropriate units)

8.5 Assure that health care professionals who interact with pregnant women, including hospital personnel, communicate breastfeeding as the norm.

→ AAP, ACNM, ACOG, ADA, AHA, AMCHP, ASTPHND, DHHS, ICEA, La Leche League, NAWD, and USDA

8.6 Continue to develop and implement ways to support and provide incentives for breastfeeding in the WIC program. This should include a review of the contents of the WIC food package for breastfeeding women and an exploration of ways to enhance incentives for breastfeeding, such as inclusion of breast pumps, bras, and pads.

→ AAFP, AAP, ACNM, ACOG, ADA, AFGPPHN, AHA, AHEA, APHA, DHHS/MCHB, MDBDF, NACOG, NAWD, and USDA

8.7 Include specific methods of supporting breastfeeding in the standards of practice for health professionals.

→ AAFP, AAP, ACNM, ACOG, ADA, AHA, ASTPHND, DHHS, ICEA, La Leche League, NAWD, and USDA

8.8 Provide lactation management training to all health care professionals who interact with pregnant and breastfeeding women to enhance their ability to support breastfeeding, and involve hospitals in networking for the promotion of breastfeeding.

→ AAP, ACNM, ACOG, ADA, AHA, ASTPHND, DHHS, ICEA, La Leche League, NAWD, and USDA

Additional Women's Nutrition for Optimal Reproductive Health Recommendations

+ Promote the adoption and implementation of standardized procedures for obtaining and recording anthropometric measurements to serve as a basis for classifying women according to weight-for-height and for setting weight gain goals over the course of pregnancy.

+ Support efforts to screen all women for nutritional risk and to assure that all high-risk women during the preconceptional, prenatal, and interconceptional periods have access to affordable, satisfactory, and individualized nutrition services.

+ Improve nutrition intervention efforts for pregnant women, including assessment, monitoring, and individualized, culturally sensitive nutrition counseling and supplemental foods.

Recommendation 9

Assure the availability of infant nutrition services targeted to pre-parent, parent, and surrogate caregivers. These services should be adapted to the economic, cultural, social, ethnic, and other circumstances of the family. Coordinate and maximize existing delivery systems, and develop infant nutrition services systems where they are not available.

Strategies for Action/ Organizations and Agencies with Potential for Collaborative Action

9.1 Convene linkage meetings at a national level, involving agencies which administer health, food, and nutrition programs serving infants and families as lead agencies.

→ DHHS/MCHB and USDA/FNS

9.2 Organize formal linkages among organizations representing nutrition service providers at state and local levels in order to share and disseminate effective educational messages, materials, teaching methods, and protocols, and to determine the most appropriate messengers.

→ AAFP, AAP, ADA, AHA, USDA Cooperative Extension Service, and state and local health departments

9.3 Expand the Maternal and Child Health Interorganizational Nutrition Group to include all organizations representing nutrition service providers.

→ AAP, AAFP, AAUAP, ACCH, ACOG, AHA, NAACOG, and NAPNAP

Recommendation 10

Provide information to the public that empowers people to take charge and assume responsibility for their own health and that of their families and to provide appropriate feeding practices for their infants.

Strategies for Action/ Organizations and Agencies with Potential for Collaborative Action

10.1 Conduct research to determine population views of appropriate feeding practices as a basis for social marketing. →

10.2 Conduct market research at the community level with high-risk groups to develop instructional strategies on breastfeeding and appropriate infant feeding practices, including oral rehydration therapy. →

10.3 Expand activities of health, social, and food assistance programs to provide training in appropriate infant feeding practices. →

10.4 Develop peer support groups to help the population. →

10.5 Eliminate the baby bottle as a symbol for the baby. →

10.6 Explore more use of mass media for public education related to infant nutrition.

→ Health care professional organizations such as AAFP, AAP, ADA, and SNE; state health, welfare, and education agencies; mass media organizations; industry; and community-based organizations such as women's groups, churches, EFNEP, NACHC, La Leche League, lactation consultants, and ICEA

Recommendation 11

*Promote breastfeeding among all women to achieve the Year 2000 National Health Promotion and Disease Prevention Objectives for breastfeeding, and establish breastfeeding as the societal norm for infant feeding.**

Strategies for Action/ Organizations and Agencies with Potential for Collaborative Action

11.1 Promote breastfeeding as the preferred method of infant feeding to the memberships of all health professional organizations.

➡ AAP, ACNM, ACOG, ADA, AHA, APHA, ASTPHND, DHHS, ICEA, La Leche League, NAWD, and USDA

11.2 Continue efforts to develop more effective strategies to promote breastfeeding through hospitals, MCH programs, WIC and other food assistance programs, industry, and other worksites, including federal agencies.

➡ AAP, ACNM, ACOG, American Dental Association, ADA, AHA, APHA, ASTPHND, AMCHP, ATMCH, DHHS, NAWD, SNE, USDA, and labor and industry organizations

11.3 Explore ways to promote breastfeeding through community programs, such as the EFNEP, food stamps, and other community-based interventions.

➡ DHHS and USDA (all appropriate units)

11.4 Encourage federal agencies to serve as models for providing support of breastfeeding women in the federal worksite.

➡ ADA, AGFPPHN, AMCHP, APHA, ASTPHND, DHHS (all appropriate units), NAWD, SNE, and USDA (all appropriate units)

11.5 Assure that health care professionals who interact with pregnant women, including hospital personnel, communicate breastfeeding as the norm.

➡ AAP, ACNM, ACOG, ADA, AHA, AMCHP, ASTPHND, DHHS, ICEA, La Leche League, NAWD, and USDA

11.6 Continue to develop and implement ways to support and provide incentives for breastfeeding in the WIC program. This should include a review of the contents of the WIC food package for breastfeeding women and an exploration of ways to enhance incentives for breastfeeding, such as inclusion of breast pumps, bras, and pads.

➡ AAFP, AAP, ACNM, ACOG, ADA, AFGPPHN, AHA, AHEA, APHA, DHHS/MCHB, MDBDF, NACOG, NAWD, and USDA

11.7 Include specific methods of supporting breastfeeding in the standards of practice for health professionals.

➡ AAFP, AAP, ACNM, ACOG, ADA, AHA, ASTPHND, DHHS, ICEA, La Leche League, NAWD, and USDA

11.8 Provide lactation management training to all health care professionals who interact with pregnant and breastfeeding women to enhance their ability to support breastfeeding, and involve hospitals in networking for the promotion of breastfeeding.

➡ AAP, ACNM, ACOG, ADA, AHA, ASTPHND, DHHS, ICEA, La Leche League, NAWD, and USDA

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* *Recommendation 11 is repeated under Women's Nutrition for Optimal Reproductive Health as Recommendation 8.*

Recommendation 12

Develop a U.S. infant feeding code which positively states the responsibilities of formula and food manufacturing industries regarding their role in promoting breastfeeding and appropriate infant feeding practices.

Strategies for Action/ Organizations and Agencies with Potential for Collaborative Action

12.1 Convene a meeting of representatives from organizations/agencies and formula and food manufacturers to cooperatively develop and endorse the code. →

12.2 Provide recommendations to federal agencies administering food assistance and related nutrition programs such as WIC (food packages), child nutrition programs, and food labeling.

→ Infant Formula Council, AAP, AAFP, ADA, AFGPPHN, AMCHP, APHA, ASTPHND, DHHS/FDA and MCHB, ICEA, NAWD, SNE, USDA/FNS, infant formula companies, and food manufacturers

Recommendation 13

Generate reliable and standardized data on infant feeding practices, including breastfeeding. Such data should provide information about service delivery as well as outcomes related to infant feeding.

Strategies for Action/ Organizations and Agencies with Potential for Collaborative Action

13.1 Convene representatives of all federal agencies and organizations that collect data, and selected agencies involved in international health, to standardize definitions used in data sets and data collection methods. Include representatives of practitioners and consumers. →

13.2 Involve potential users in the development and pilot-testing of the new standardized definitions. →

13.3 Disseminate definitions to states, provide training on their use, and provide coordination and technical assistance to state and local agencies that wish to augment the standard data collection. →

13.4 Assure that the standardized system collects only essential data, tracks service delivery, assesses selected outcomes associated with breastfeeding and infant feeding practices, and provides feedback to contributors on a timely basis.

→ AHA, ASTHO, ASTPHND, DHHS/CDC, CHC, FDA, MCHB and NCHS, NAWD, PHF, and USDA/FNS

Recommendation 14

Specify priorities for research in infant nutrition and advocate for increases in research funding.

Strategies for Action/ Organizations and Agencies with Potential for Collaborative Action

14.1 Identify and include research needs related to infant nutrition within MCH priorities for funding.

➡ ACSN, USDA, and DHHS (all appropriate units; e.g., Child Nutrition Research Centers, CDC, MCHB, and NCHS)

14.2 Specifically encourage further research on the growth patterns of breastfed infants, formula-fed infants, and infants with special health care needs. ➡

14.3 Improve the implementation of standard methods of obtaining anthropometric measurements from normal infants and children, and establish more adequate standards for assessing the growth of children with special health care needs.

➡ AAP, ACSN, AGFPPHN, ASTPHND, and DHHS/CDC

14.4 Develop and/or select a standardized set of nutrition status indicators for infants for use by all agencies providing infant nutrition services.

➡ AAP, AGFPPHN, DHHS/MCHB, and USDA

Additional Infant Nutrition Recommendations

+ Establish policies to improve facilities for infant feeding in worksites, day care settings, schools, public buildings such as convention or conference centers, jails, and emergency shelters.

Recommendation 15

Coordinate nutrition services with the health and safety recommendations in the Child Care and Development Block Grant.

Strategies for Action/ Organizations and Agencies with Potential for Collaborative Action

15.1 Request DHHS/OHD and MCHB, and USDA/FNS, to collaborate in the development and implementation of nutrition services resulting from the Child Care and Development Block Grant to reduce duplication of oversight costs and audits; provide technical assistance; and establish consensus on standards for nutrition, health, and safety. →

15.2 Encourage designated responsible agencies at the state level (e.g., state health, welfare, and education agencies) to develop interagency agreements and other collaborative mechanisms to assure generation of nutrition standards, reduction of duplication of oversight costs and audits, and provision of technical assistance including the identification of resources for training in nutrition. →

15.3 Request that DHHS/MCHB disseminate the APHA/AAP standards for nutrition in child care to state nutrition staff in departments of health, education, and social services, with a cover letter explaining the nutrition standards and the names of the federal contacts.

→ AAP, ADA, APHA, ASTPHND, DHHS/OHD and MCHB, CWLA, NAFDC, NASW, and USDA/FNS

15.4 Assure the implementation of Head Start standards for nutrition services in all Head Start programs, encouraging collaboration between the regional Head Start coordinator and other child nutrition programs.

→ AAP, ADA, APHA, ASFSA, ASTPHND, DHHS/OHD and MCHB, CWLA, NAFDC, NASW, and USDA/FNS.

Recommendation 16

Provide specialized nutrition and food service management training for nutritionists/dietitians working in schools and in the child care community, including those serving children with special health care needs.

Strategies for Action/ Organizations and Agencies with Potential for Collaborative Action

16.1 Establish curriculum guidelines to improve undergraduate education and continuing education of nutritionists/dietitians working in the child care community (e.g., early childhood programs, Head Start programs, or group homes). Such guidelines should address children with special health care needs. →

16.2 Provide funding for these programs and solicit universities/training centers to offer training opportunities. →

16.3 Advocate for the establishment and filling of a nutrition position in the DHHS/ACYF's Office of Human Development, to provide needed leadership, consultation, and technical assistance in nutrition.

→ AAFP, AAP, AAUAP, ADA, AFGPPHN, AMCHP, APHA, ASFSA, ASTPHND, DHHS/ACYF, NAEYC, NAWD, NPTA, SNE, USDA, and related state counterparts

Recommendation 17

*Ensure quality nutrition education programs for school-age children and adolescents, including children with special health care needs.**

Strategies for Action/ Organizations and Agencies with Potential for Collaborative Action

17.1 Include a nutrition component in the comprehensive health education curriculum offered K–12 in all states.

➡ ADA, AHEA, ASHA, NASN, SAM, SNE, SOPHE, and ISDA/HNIS

17.2 Assess health curriculum for inclusion of nutrition; nutrition content description; integration of nutrition into total curriculum; and actual implementation of nutrition component.

➡ AAPHER, ADA, AHEA, ASHA, NASN, NET, SAM, SNE, and SOPHE

17.3 Develop and disseminate national guidelines for school-based nutrition education and fitness programs. Such guidelines should address content areas, integration into the total curriculum, strategies for behavioral change, and teaching of skills needed to make informed dietary decisions.

➡ AAFP, AAP, AAPHER, ACS, American Dental Association, ADA, AHA, AHEA, APHA/School Health Section and Food and Nutrition Section, ASFSA, ASHA, FRAC, National Cholesterol Education Program Coordinating Committee, NASN, NEA, NET, NPTA, SAM, SNE, and SOPHE

17.4 Obtain funding sources for development of, dissemination of, and training on the national guidelines.

➡ AFGPPHN, ASTPHND, DHHS/MCHB Adolescent Health Training Projects, state NET directors, state and local departments of health and education, and the USDA Cooperative Extension Service

17.5 Train teachers, food service workers, school health personnel, and coaches to implement the guidelines.

➡ AFGPPHN, ASTPHND, DHHS/MCHB Adolescent Health Training Projects, state NET directors, state and local departments of health and education, SNE, and the USDA Cooperative Extension Service

17.6 Use a cadre of qualified health professionals to provide growth, development, and nutrition training to coaches, school food service personnel, parents/caregivers, teachers, school administrators, etc.

➡ ASFA, DHHS/MCHB Adolescent Health Training Projects, SAM, state adolescent coordinators (Title V), and state departments of health and education.

17.7 Integrate age-appropriate, comprehensive food and nutrition education and nutrition services into school health programs.

➡ AHEA, DHHS/CDC and MCHB, DOE, NASN, NEA, NPTA, and USDA

17.8 Increase the use of school-based health clinics, different community settings (e.g., 4-H and EFNEP), and outlets (media channels) to deliver nutrition education to school-age children, including adolescents.

➡ ADA Ambassadors, Advertising Council, NASN, and the Public Relations Society of America

17.9 Advocate for the NET program to be funded at the levels authorized by Congress.

➡ AAMR, ADA, ASFSA, FRAC, SAM, and SNE

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* *Recommendation 17 is repeated under Adolescent Nutrition as Recommendation 21.*

Recommendation 18

Strengthen and improve food services for children and adolescents.†

Strategies for Action/ Organizations and Agencies with Potential for Collaborative Action

18.1 Develop a model nutrition policy for food served at schools that meets the U.S. Dietary Guidelines and the Recommended Dietary Allowances and includes elimination of the sale of low-nutrient foods during school hours, use of the school cafeteria as a learning laboratory for nutrition education, and implementation of strategies to increase participation in school meals.

→ ADA, ASFSA, NAEYC, NEA, NPTA, SAM, SNE, Youth Advisory Councils, and minority organizations

18.2 Encourage school authorities to adopt the model nutrition policy, and assist school food service personnel to incorporate and apply it.

→ ADA, ASFSA, FSMI, NEA, NET, and SAM

18.3 Propose federal regulations to require qualified personnel to direct and manage school food service programs.

→ ADA, ASFSA, SAM, and USDA

18.4 Increase reimbursement for school meals so that the U.S. Dietary Guidelines and the RDAs can be met for all children.

→ ASFSA and USDA

18.5 Establish or review nutrition standards for food service in child and adolescent group care facilities such as juvenile detention centers, runaway shelters and residential treatment facilities, and maternity homes or other facilities serving pregnant adolescents, and initiate action needed to improve standards.

→ ADA, APHA, ASFSA, ASTPHND, CWLA, SAM, DHHS/MCHB and OHD, Department of Justice, NASW, and USDA/FNS.

18.6 Develop strategies to change adolescent eating patterns in school and/or other large populations, considering their specific environments.

→ MCHB/Adolescent Health Training Project Faculty

Recommendation 19

Promote population-based research to (1) determine the natural history of cholesterol, obesity, and hypertension; (2) determine familial and institutional factors/interventions/strategies which influence children to have healthy eating patterns (habits); and (3) determine the most cost-effective and efficient ways to deliver nutrition services to children and their families

Strategies for Action/ Organizations and Agencies with Potential for Collaborative Action

19.1 Provide additional funds for research to federal agencies that conduct population-based research (e.g., CDC, NCHS, MCHB/DHHS and HNIS, ARS and Child Nutrition Research Center/USDA). →

19.2 Encourage the inclusion of children in NHANES follow-up studies and advocate for adequate funds to support such studies. →

19.3 Encourage prevention centers and other universities to include applied child nutrition research on their agendas. →

19.4 Request private/voluntary agencies which have access to national nutrition data related to children to share national findings with other researchers.

→ ADA, AFGPPHN, AMCHP, APHA, ASTPHND, NAWD, SNE, and DHHS/MCHB, CDC, NCHS, NICHD, and USDA/HNIS/ Agricultural Research Service/Child Nutrition Research Center

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† *Recommendation 18 is repeated under Adolescent Nutrition as Recommendation 22.*

Additional Child Nutrition Recommendations

- Promote comprehensive school health programs, and increase nutrition services for school-age (5–12) children through expansion of school-based curriculum.
- Assist the Head Start program in improving nutrition services and meeting the nutrition component of the program performance standards.
- Develop alternatives to fast-food vending machines as sources of income in schools, or change food choices in vending machines.

Adolescent Nutrition Recommendations[*]

Recommendation 20

Improve the nutrition component of health services for adolescents, including pregnant adolescents and those with special health care needs.

Strategies for Action/ Organizations and Agencies with Potential for Collaborative Action

20.1 Identify the availability and adequacy of adolescent-oriented nutrition services in various settings and the roles and responsibilities of various personnel providing such services. →

20.2 Encourage state agencies to ensure that coalitions are developed to advocate for improvement in nutrition policies, legislation, and service delivery for adolescents. The coalition developed in Colorado under a DHHS/MCHB grant might be used as a model to be modified or adapted to community characteristics and replicated at the local level.

→ AAFP, AAP, ACNM, ADA, AFGPPHN, AHA, AMCHP, APHA, ASTPHND, DHHS/CDC, HCFA, MCHB, NHLBI, NASW, NAWD, SAM, SNE, and USDA/FNS

20.3 Strengthen collaboration between state adolescent coordinators and state nutrition personnel. →

20.4 Develop strategies for integrating nutrition services, education, and intervention into adolescent health services. →

20.5 Include nutrition screening, assessment, and referral in all health assessments of adolescents. →

20.6 Increase access to food assistance services (e.g., school feeding and the WIC program) and to more intensive nutrition counseling for pregnant adolescents. →

Recommendation 21

Ensure quality nutrition education programs for school-age children and adolescents, including children with special health care needs.[†]

Strategies for Action/ Organizations and Agencies with Potential for Collaborative Action

21.1 Include a nutrition component in the comprehensive health education curriculum offered K–12 in all states.

→ ADA, AHEA, ASHA, NASN, SAM, SNE, SOPHE, and USDA/HNIS

21.2 Assess health curriculum for inclusion of nutrition; nutrition content description; integration of nutrition into total curriculum; and actual implementation of nutrition component.

→ AAHPERD, ADA, AHEA, ASHA, NASN, NET, SAM, SNE, and SOPHE

21.3 Develop and disseminate national guidelines for school-based nutrition education and fitness programs. Such guidelines should address content areas, integration into the total curriculum, strategies for behavioral change, and teaching of skills needed to make informed dietary decisions.

→ AAFP, AAP, AAHPERD, ACS, American Dental Association, ADA, AHA, AHEA, APHA/ School Health Section and Food and Nutrition Section, ASFSA, ASHA, FRAC, National Cholesterol Education Program Coordinating Committee, NASN, NEA, NET, NPTA, SAM, SNE, and SOPHE

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[*] *The Adolescent Nutrition Work Group recommends that organizations advocate for a White House Conference on children and youth.*

[†] *Recommendation 21 is repeated under Child Nutrition as Recommendation 17.*

Recommendation 21 (Cont'd)

21.4 Obtain funding sources for development of, dissemination of, and training on the national guidelines.

→ AFGPPHN, ASTPHND, MCHB Adolescent Health Training Projects, state NET directors, state and local departments of health and education, and the USDA Cooperative Extension Service

21.5 Train teachers, food service workers, school health personnel, and coaches to implement the guidelines.

→ AFGPPHN, ASTPHND, MCHB Adolescent Health Training Projects, state NET directors, state and local departments of health and education, and the USDA Cooperative Extension Service

21.6 Use a cadre of qualified health professionals to provide growth, development, and nutrition training to coaches, school food service personnel, parents/caregivers, teachers, school administrators, etc.

→ ASFA, DHHS/MCHB Adolescent Health Training Projects, SAM, state adolescent coordinators (Title V), and state departments of health and education.

21.7 Integrate age-appropriate, comprehensive food and nutrition education and nutrition services into school health programs.

→ AHEA, DHHS/CDC and MCHB, DOE, NASN, NEA, NPTA, and USDA

21.8 Increase the use of school-based health clinics, different community settings (e.g., 4-H and EFNEP), and outlets (media channels) to deliver nutrition education to school-age children, including adolescents.

→ ADA Ambassadors, Advertising Council, NASN, and the Public Relations Society of America

21.9 Advocate for the NET program be funded at the levels authorized by Congress.

→ AAMR, ADA, ASFSA, FRAC, SAM, and SNE

Recommendation 22

Strengthen and improve food services for children and adolescents.[§]

Strategies for Action/ Organizations and Agencies with Potential for Collaborative Action

22.1 Develop a model nutrition policy for food served at schools that meets the U.S. Dietary Guidelines and the Recommended Dietary Allowances and includes elimination of the sale of low-nutrient foods during school hours, use of the school cafeteria as a learning laboratory for nutrition education, and implementation of strategies to increase participation in school meals.

→ ADA, ASFSA, NAEYC, NEA, NPTA, SAM, SNE, Youth Advisory Councils, and minority organizations

22.2 Encourage school authorities to adopt the model nutrition policy, and assist school food service personnel to incorporate and apply it.

→ ADA, ASFSA, FSMI, NEA, NET, and SAM

22.3 Propose federal regulations to require qualified personnel to direct and manage school food service programs.

→ ADA, ASFSA, SAM, and USDA

22.4 Increase reimbursement for school meals so that the U.S. Dietary Guidelines and the Recommended Dietary Allowances can be met for all children.

→ USDA

[§] *Recommendation 22 is repeated under Child Nutrition as Recommendation 18.*

22.5 Establish or review nutrition standards for food service in child and adolescent group care facilities such as juvenile detention centers, runaway shelters, and residential treatment facilities, and maternity homes or other facilities serving pregnant adolescents, and initiate action needed to improve standards.

→ ADA, APHA, ASFSA, ASTPHND, CWLA, DHHS/MCHB and OHD, Department of Justice, NASW, SAM, and USDA/FNS

22.6 Develop strategies to change adolescent eating patterns in school and/or other large populations, considering their specific environments.

→ MCHB/Adolescent Health Training Project Faculty

Recommendation 23

Improve the nutrition knowledge base and skills of service providers, educators, and parents/caregivers.

Strategies for Action/ Organizations and Agencies with Potential for Collaborative Action

23.1 Include the developmental (psychosocial and physical) and nutrition needs and concerns unique to adolescents in the training and course curricula of medical, nursing, dental, and nutrition programs. Increase opportunities for training and continuing education in adolescent nutrition, including the needs of pregnant adolescents and those with special health care needs. →

23.2 Provide training for coaches, trainers, exercise physiologists, and other sports personnel working with youth. →

23.3 Provide training for parents/caregivers of adolescents by making greater use of such settings as worksites, supermarkets, and community centers to deliver nutrition education. →

23.4 Provide training for teachers, educators (including special education personnel), school nurses, and school food service personnel, as well as for individuals in public, private, and voluntary organizations that may provide nutrition education to adolescents. →

23.5 Provide training to staff of group care facilities for adolescents.

→ AAFP, AAHPERD, AAP, ADA, AFGPPHN, ASFSA, ASTPHND, DHHS/MCHB Adolescent Health Training Projects, DOE, SAM, SNE, and USDA/FNS and Cooperative Extension Service

23.6 Develop a position paper on the need for training in adolescent nutrition. Include the role of paraprofessionals.

→ ADA, DHHS/OSAP/high-risk youth programs, and SAM

Recommendation 24

Expand the research base in adolescent nutrition.

Strategies for Action/ Organizations and Agencies with Potential for Collaborative Action

24.1 Identify on a scientific basis eating patterns that result in wellness versus acute and/or chronic disease.

→ AAP, ACS, ADA, American Heart Association, DHHS/CDC, MCHB, and NHLBI, SAM, and USDA/FNS

24.2 Conduct research to determine the nutrition requirements of adolescents, particularly in relation to sexual maturity, special health care needs, and substance abuse. →

24.3 Study the diagnosis, assessment, and/or treatment of adolescent obesity, eating disorders, and nutrition-related risk factors for chronic diseases. →

Recommendation 24 (Cont'd)

24.4 Conduct research to determine effective methods of establishing and maintaining healthy eating and exercise habits among adolescents, including those with special health care needs.

→ AA/BA, AAFP, AAP, ANAD, ASCN, DHHS/Clinical Nutrition Centers, MCHB, and NICHD, SAM, and USDA/Agricultural Research Service, Child Nutrition Research Center

24.5 Develop a data base which includes market research data at local, state, and national levels to access and monitor the growth and the nutrition status, knowledge, attitudes, concerns, and issues related to adolescents from all socioeconomic levels, including high-risk groups of the adolescent population, such as pregnant adolescents and those with special health care needs.

→ DHHS/CDC, MCHB, and NCHS

Additional Adolescent Health Recommendations

+ Establish baseline data and surveillance systems at the local, state, and national levels to assess the growth and nutrition status of all adolescents, with special emphasis on the economically disadvantaged and other high-risk groups, including pregnant adolescents.

+ Build coalitions of organizations/agencies (e.g., public, private, voluntary, and professional) at local, state, and national levels to improve the nutritional health status of all adolescents and to address the needs of pregnant adolescents, those with special health care needs, and other at-risk groups.

+ Develop for adolescents basic nutrition health strategies that relate to wellness.

Recommendation 25

Expand access (awareness, availability, accountability, affordability, and acceptability) to nutrition services in all settings serving children with special health care needs and their families, and ensure that these services are culturally sensitive, family centered, and community based.

Strategies for Action/ Organizations and Agencies with Potential for Collaborative Action

25.1 Educate families, policymakers, providers, and the community about the availability, components, providers, payment sources, and benefits of nutrition services, and about gaps in these areas. ➡

25.2 Encourage professional organizations to provide inservice education to members related to the nutrition of children with special health care needs (CSHCN), develop and disseminate materials, and sponsor and conduct workshops.

➡ AAFP, AAP, AAUAP, ADA, AOTA, APA, APHA, CWLA, DHHS/BHCDA and MCHB, NACHC, NAPNAP, and state Title V agencies and mental health agencies

25.3 Eliminate barriers to nutrition services by including nutritionists on primary care teams and recommending expansion of state Title V and primary health care programs (e.g., community health centers) which provide for participation of nutritionists on such teams.

➡ AMCHP, DHHS/BHCDA and MCHB, and NACHC

25.4 Increase the number of P.L. 99–457 interagency coordinating councils at the state and local levels that include nutritionists as members. Continue to inform the members of professional organizations such as ADA and AAMR about the role of nutritionists in such councils. Communicate with the lead P.L. 99–457 agency about the role and value of nutritionist participation on committees and councils, and recommend that state dietetic associations identify qualified nutritionists who can assist the lead agency with planning for P.L. 99–457.

➡ AAMR, ADA, AAUAP, DHHS/MCHB, and DOE

25.5 Strengthen the level of technical knowledge and skill among all human service providers and families as they relate to the nutrition needs of CSHCN. Request that national professional organizations and their state chapters publicize existing interdisciplinary training programs to members. Utilize nutritionists as resources for nutrition information and materials, and sponsor educational programs on nutrition topics.

➡ AAFP, AAMR, AAP, AAUAP, ADA, APHA, AOTA, NAPNAP, and NASW

25.6 Expand linkages between hospitals and community-based programs contributing to a comprehensive, coordinated, community-based, culturally sensitive, family-centered system of care. Encourage agencies involved with discharge planning to seek and utilize nutrition services, and encourage information and referral services to include information about nutrition services in their data bases.

➡ AAMR, AAUAP, ADA, Association of Discharge Planners, NAPNAP, and NASW

Recommendation 25 (Cont'd)

25.7 Include families from service populations in all levels of policy development (e.g., training, service, and research) in implementation of new and ongoing interdisciplinary programs for human service providers, and in the development, implementation, and evaluation of services. Encourage organizations and agencies to include families on their advisory committees.

➡ AAP, AAUAP, ADA, AFGPPHN, AMCHP, APHA, DHHS/ACYF, BHCDA, and MCHB, HMHB, MDBDF, NACHC, National Dairy Council, NAPNAP, NASW, NAWD, and SNE

25.8 Provide the Medicaid agency with available data regarding costs and benefits of nutrition services for children with special needs.

➡ ADA, AFGPPHN, AMCHP, ASTPHND, and DHHS/MCHB

Recommendation 26

Improve the quality of nutrition services available to children with special health care needs.

Strategies for Action/ Organizations and Agencies with Potential for Collaborative Action

26.1 Increase participation of individuals interested in the nutrition of CSHCN in the MCH block grant application process. Provide guidelines on how to get involved in the grant application process, points to consider, other organizations to involve, timing, and recommendations for testimony.

➡ AAMR, APTA, ADA/practice groups and relevant committees, AMCHP, APHA, AOTA, American Speech-Language-Hearing Association, and ASTPHND

26.2 Advocate for every state CSHCN program to employ a state-level nutrition professional for children with special health care needs.

➡ AAMR, ADA, AMCHP, ASTPHND, DHHS/MCHB, and MDBDF

26.3 Advocate for a nutrition professional to be available to state department of education and special education staff (e.g., a consultant registered dietitian position similar to the existing physical therapy/occupational therapy consultant positions).

➡ AMCHP, ASTPHND, OSERS, and parent groups

26.4 Involve nutrition professionals in the development of the Individual Education Plan (IEP) and the Individual Family Service Plan (IFSP) process at state and local levels. Recommend models for local use, and educate nutrition professionals about IEP and IFSP processes.

➡ AAMR, AAUAP, ADA, state directors of special education, and parent groups

26.5 Develop a standardized screening and referral system for children with special health care needs and promote its adoption by relevant professional organizations.

➡ AAP, ADA, ANA, ASHA, and ASTPHND

Recommendation 27

Improve the documentation of need by establishing a nutrition data system for children with special health care needs.

Strategies for Action/ Organizations and Agencies with Potential for Collaborative Action

27.1 Include CSHCN as a group (data set) in the National Nutrition Monitoring System (NNMS) and other national and state data systems. Advocate for their inclusion with the NNMS advisory committee and monitor the status of the advisory committee follow-up.

➡ ADA, AFGPPHN, AMCHP, APHA, ASTPHND, DHHS/CDC, MCHB, and NIMH, DOE, NAWD, and SNE

27.2 Collect new data regarding the cost and impact of care (especially for nutrition services) for CSHCN.

➡ AAUAP, ADA, DHHS/MCHB and related SPRANS grantees

27.3 Establish a surveillance system for CSHCN and request consideration of such children for targeting in national surveys such as the National Health and Nutrition Examination Survey (HANES) IV, National Health Interview Survey (NHIS), and the Ambulatory Medical Care Survey.

➡ ADA, AFGPPHN, AMCHP, APHA, ASTPHND, DHHS/CDC, MCHB, and NCHS, NAWD, and SNE

27.4 Request state MCH programs to include information about the nutrition status of CSHCN as part of their statewide needs assessment.

➡ AMCHP, ASTHO, ASTPHND, and DHHS/MCHB

27.5 Include registered dietitians with expertise in CSHCN in the development of a national minimum data set for CSHCN; disseminate products of relevant SPRANS projects on indicators for CSHCN (e.g., Automated Case Management System/Community-Based Care Coordination Project for CCS Children and Their Families in Los Angeles County, California Children's Services of Los Angeles County); and encourage the inclusion of nutrition indicators in the data set.

➡ AAUAP, AMCHP, ASTHO, ASTPHND, DHHS/CDC and MCHB, and PHF

Recommendation 28

Improve the basic and continuing education for all personnel involved with children with special health care needs.

Strategies for Action/ Organizations and Agencies with Potential for Collaborative Action

28.1 Include coursework and field experience related to CSHCN in the training of registered dietitians. Recommend questions related to nutrition for CSHCN for inclusion in the registration examination administered by the Commision on Dietetic Registration, and provide such questions to the ADA/Council on Education.

➡ Commission on Dietetic Registration, ADA/Council on Education, and DDPD practice group

28.2 Request that University Affiliated Programs for Persons with Developmental Disabilities reach out to colleges and universities to provide guest lecturers and internship rotation sites. Provide options for short-term or long-term experiences in nutrition training programs, and provide necessary funding for nutrition.

➡ AAMR, AAUAP, and DHHS/MCHB

28.3 Provide education on the nutrition needs of CSHCN for health and human services personnel, including day care and school food-service workers. Include parents in the planning and teaching of the curriculum. Encourage professional organizations representing providers to identify individuals who can advocate for the inclusion of nutrition for CSHCN in the training of health professionals.

➡ AAFP, AAP, AAUAP, American Dental Association, ADA, ASFSA, American Speech-Language-Hearing Association, ANA, AOTA, APTA, Head Start Directors' Association, and parents' groups

Recommendation 28 (Cont'd)

28.4 Encourage state CSHCN programs to support and promote attendance of their professional staff at the advanced courses on nutrition for CSHCN which are funded by DHHS/MCHB.

→ AAFP, AAUAP, ADA, AFGPPHN, AMCHP, ASFSA, ASTPHND, DHHS/MCHB, and NAWD

28.5 Encourage state departments of education to use the services of state CSHCN nutritionists to provide consultation, inservice training, and technical assistance to their staff.

→ AAFP, AAUAP, ADA, AFGPPHN, AMCHP, ASFSA, ASTPHND, DHHS/MCHB, DOE, NAWD, and NPTA

28.6 Provide continuing education credit for registered dietitians and other professionals through multiple avenues such as attending and giving presentations on nutrition for CSHCN at national meetings of organizations interested in CSHCN, publishing articles about nutrition for CSHCN in professional journals, preparing and disseminating audiotapes and videotapes on the subject, and studying other continuing education materials published on the subject by professional organizations.

→ AAMR, AAUAP, ADA, AFGPPHN, AMCHP, AOTA, NCEMCH, and Pathfinders

Additional Nutrition for Children with Special Health Care Needs Recommendations

+ Heighten the awareness of parents and service providers regarding the importance and role of nutrition in the care of children with special needs, including those with "new conditions" such as pediatric AIDS and drug exposure. Help them recognize and identify nutrition-related problems of children at risk and make appropriate referrals.

+ Improve the quality of clinical nutrition services provided for special needs children by implementing the use of appropriate nutrition screening and referral tools to identify and refer children at risk; implementing the use of standardized protocols to assure the quality of nutrition screening, assessment, intervention services, and monitoring; expanding linkages with community programs which can contribute to a comprehensive, coordinated, community-based, and family-centered system of care; and developing effective referral mechanisms between tertiary care centers and community-based providers.

+ Increase awareness and knowledge of the nutrition needs of children with special health care needs among all human services providers (including nutritionists) and families by: including content and/or field experiences which address CSHCN in undergraduate and graduate human services programs; and developing inservice and continuing education opportunities which focus on strengthening service networks and on developing skills in delivering services in non-traditional clinical settings (e.g., homes, schools, and day care centers).

+ Expand research focused on the role of nutrition in the etiology of growth retardation and other abnormalities; the energy and nutrient needs of children with changed activity levels and/or body mass, chromosomal abnormalities, and chronic medications; the techniques/formulas for measuring the body composition of children with altered distribution of fat and lean body mass, and for assuring and monitoring growth in those conditions which preclude the use of standard anthropometric techniques; the role of nutrition in the treatment of infants/children with HIV infection and cancer; and the documentation of the positive effects of early nutrition intervention, including the growth and development of high-risk neonatal intensive care unit infants.

+ Address lack of community-based feeding and nutrition services for CSHCN in schools. Direct special attention to meeting the nutrition-related needs of CSHCN as more of them are mainstreamed in preschool and school settings.

+ Improve the planning, implementation, and evaluation of nutrition services for CSHCN (Title V MCH Block Grant) by assuring that a state-level nutrition professional is available for the CSHCN program; developing parent-professional collaborative efforts; and clarifying the role of the state Title V program in assuring that nutrition services are available at state and local levels.

Glossary of Acronyms

AA/BA	American Anorexia/Bulimia Association
AAFP	American Academy of Family Physicians
AAHPERD	American Alliance for Health, Physical Education, Recreation, and Dance
AAMC	Association of American Medical Colleges
AAMR	American Academy on Mental Retardation
AAP	American Academy of Pediatrics
AAUAP	American Association of University Affiliated Programs for Persons with Developmental Disabilities
ABMS	American Board of Medical Specialities
ACCH	Association for the Care of Children's Health
ACNM	American College of Nurse Midwives
ACOG	American College of Obstetricians and Gynecologists
ACPM	American College of Preventive Medicine
ACS	American Cancer Society
ACYF	Administration for Children, Youth and Families
ADA	American Dietetic Association
AFGPPHN	Association of Faculties of Graduate Programs in Public Health Nutrition
AHA	American Hospital Association
AHEA	American Home Economist Association
AIN	American Institute of Nutrition
AMA	American Medical Association
AMCHP	Association of Maternal and Child Health Programs
ANA	American Nurses' Association
ANAD	National Association of Anorexia Nervosa and Associated Disorders
AOTA	American Occupational Therapy Association
APA	American Psychological Association
APHA	American Public Health Association
APTA	American Physical Therapy Association
ASCN	American Society for Clinical Nutrition
ASFSA	American School Food Service Association
ASHA	American School Health Association
ASTHO	Association of State and Territorial Health Officials
ASTPHND	Association of State and Territorial Public Health Nutrition Directors
ATMCH	Association of Teachers of Maternal and Child Health
BHCDA	Bureau of Health Care and Delivery Assistance
BHP	Bureau of Health Professions
CEPH	Council on Education in Public Health
CDC	Centers for Disease Control
CHC	Community Health Centers
CNI	Community Nutrition Institute
COSSMHO	National Coalition of Hispanic Health and Human Services Organization
CSWE	Council on Social Work Education
CWLA	Child Welfare League of America
DDPD	Dietetics in Developmental and Psychiatric Disorders
DHHS	United States Department of Health and Human Services
DOE	United States Department of Education
EFNEP	Expanded Food and Nutrition Education Program
EPSDT	Early and Periodic Screening, Diagnosis and Treatment
FDA	Food and Drug Administration
FNS	Food and Nutrition Service
FRAC	Food Research and Action Center
FSMI	National Food Service Management Institute
HCFA	Health Care Financing Administration
HIAA	Health Insurance Association of America
HMHB	Healthy Mothers, Healthy Babies Coalition
HMO	Health Maintenance Organization
HNIS	Human Nutrition Information Service
ICEA	International Childbirth Education Association
IHS	Indian Health Service
IOM	Institute of Medicine
MCH	Maternal and Child Health
MCHB	Maternal and Child Health Bureau
MCHING	Maternal and Child Health Interorganizational Nutrition Group

Glossary of Acronyms (Continued)

MDBDF	March of Dimes Birth Defects Foundation
NAACOG	Nurses Association of the American College of Obstetricians and Gynecologists
NACHC	National Association of Community Health Centers
NACHRI	National Association of Children's Hospitals and Related Institutions
NAEYC	National Association for the Education of Young Children
NAFDC	National Association for Family Day Care of Child Care Child Development Programs
NAPNAP	National Association of Pediatric Nurse Associates and Practioners
NAS	National Academy of Sciences
NASN	National Association of School Nurses
NASW	National Association of Social Workers
NAWD	National Association of WIC Directors
NCEMCH	National Center for Education in Maternal and Child Health
NCHS	National Center for Health Statistics
NEA	National Education Association
NET	Nutrition Education and Training
NGA	National Governors' Association
NHLBI	National Heart, Lung, and Blood Institute
NICHD	National Institute of Child Health and Human Development
NIMH	National Institute of Mental Health
NLN	National League for Nursing
NPTA	National Parents and Teachers Association
NUL	National Urban League
OHD	Office of Human Development
OSAP	Office for Substance Abuse Prevention
OSERS	Office of Special Education and Rehabilitative Services
PHF	Public Health Foundation
PPO	Preferred Provider Organization
SAM	Society for Adolescent Medicine
SFAA	Society for Applied Anthropology
SNE	Society for Nutrition Education
SOPHE	Society for Public Health Education
SPRANS	Special Projects of Regional and National Significance
UCPA	United Cerebral Palsy Association
USDA	United States Department of Agriculture
WIC	Special Supplemental Food Program for Women, Infants and Children

Plenary Sessions

National Trends, Needs, and Issues in Maternal and Child Health: Implications for Nutrition Services

Plenary Session

The Honorable John D. Rockefeller IV
Unites States Senator
Chair, National Commission on Children

It is an honor and genuine pleasure to join you today. I appreciate this chance to know more about you, particularly the organizations that are sponsoring this national workshop.

Let me begin by applauding you for your commitment to improving the nutritional status and health of our nation's mothers, children, and families. I have no doubt that each of you deserves enormous gratitude from your fellow Americans for creating, expanding, and strengthening efforts—within your communities, your states, and even nationally—on behalf of children and families.

I want you to know that the nutritional and health care needs of our people are precisely what is on my mind. The more I learn about the problems, the more upset I become, and impatient, and determined to do something about them. When I look at the studies and research that show without a doubt the payoffs of prenatal care, proper nutrition, and access to basic health care, I simply cannot believe we have fallen so short of what makes economic and moral sense. Then, when I reflect on the times when America has faced up to other crises and challenges, I conclude that, by God, we must face up to this one.

As a West Virginian and former governor of my state, I have grappled with the problems of hunger and inadequate health care for many years. I have spent painful times with unemployed parents and with families struggling on low wages—who, because they did not have health insurance, could not take their children to a doctor when they developed an earache or serious temperature. I have spoken with teachers who have told me about trying to motivate and educate children who start the day without breakfast.

When I was governor, I worked hard to develop programs to reduce our infant mortality rate (and we made a major dent), introduce school breakfasts and expand the school lunch program, increase funding for primary health care services, and respond to other pressing needs.

And now, as a senator, I am trying to push and fight for the action it will take to bring about the day when every child in America has access to basic, affordable health care. When every pregnant woman gets prenatal care, and early. When all children get the other necessary ingredients of good health—the proper vaccinations, adequate nutrition, some regular exercise, and a life that is free of tobacco, drugs, and other preventable and very real dangers.

Two years ago, I was handed two assignments that have enabled me to focus on these issues. More importantly, they propelled me to consider what must happen on the broadest possible scale to solve the problem of the uninsured and meet the vital needs of America's children. One was the chairmanship of the Pepper Commission on Health, the other the chairmanship of the National Commission on Children.

As chairman of the Pepper Commission, I have worked intensely with other health care leaders in Congress to come up with a plan of action aimed at achieving universal access to health care for all of our people—children, mothers, fathers, all Americans. It is my conclusion that our country has to come to grips with this crisis. Plugging in the holes with expansions in Medicaid, funding increases for other health care programs, and special demonstration projects do help. But it is time to be bolder and far more ambitious. It is time to take the necessary action to provide health care coverage to the more than 8 million children who are still uninsured, to ensure that the millions of women of childbearing age have health insurance and get prenatal care starting in that first trimester.

Imagine—in 1987, 154,000 infants were born to mothers who did not receive prenatal care until their third trimester. Approximately 74,000 infants were born to mothers who did not receive any prenatal care at all. This explains why almost 40,000 babies died before they reached their first birthday. It gives more than a hint as to why over a quarter of a million children entered this world dangerously, weighing less than 5 1/2 pounds. These, of course, are the babies who are in peril of dying or likely to develop lifelong defects and disabilities that hold them back from becoming productive, energetic members of our society.

This is why the Pepper Commission called for action and laid out a specific blueprint of steps to take during the next five years to achieve health care coverage for every child and adult in America. A complete, comprehensive overhaul, in my view, is the only solution and our only choice ultimately. We call on all employers to offer health insurance, with the help of insurance reforms, tax incentives, and other measures. We propose to eliminate Medicaid, and by drawing on the funds that currently go to that program, we suggest a new, national public plan with a single set of eligibility standards and benefits. This plan would cover poor families and children, and those who cannot get health insurance through the workplace. We recommend that prenatal care, well baby care, and other basic, preventive services be included in any health care package, private or public.

Even this, I realize, is not the total answer to meeting the nutritional and health care needs of children. But it is a major part of the answer. It is unconscionable that a child in Alabama or Mississippi has no health care coverage because his or her parents are not in the lowest depths of poverty, whereas a family with that same income is covered in other states because the Medicaid rules there are more generous, if one can use that word in the same sentence as "Medicaid."

I want you to know that I will be working doggedly for legislative action to turn the Pepper Commission's vision into reality. At the same time, I will continue to push for immediate changes to expand and improve health care for children, pregnant women, and families. Frankly, I would like us to go beyond taking "baby steps" forward and to achieve bigger, adult-sized steps instead. To be even more honest, I believe President Bush should declare the lack of health care for pregnant women and children a national emergency, and provide the leadership needed to make health care for children the nation's priority.

This was my message when, with the support of other senators, including

Senator Orrin Hatch, I introduced a bill in September called "Better Health Protection for Mothers and Children." It proposed an additional $2.8 billion for Medicaid to guarantee coverage for every child in America whose family has an income below the poverty line. My bill also calls for steps to improve the fees paid by Medicaid for prenatal and child health services, and to improve the quality of care that is provided.

The good news is that Congress does seem to be recognizing the need for action on behalf of children. Despite all you heard about the dissension over the budget, the fact is that the final package, which President Bush signed into law, earmarks $1.1 billion to reach the very same goal set in my bill—Medicaid coverage for all poor children. Regrettably, the constraints of the budget forced us to compromise and target the fulfillment of this goal to the year 2002, but at least we are on our way.

The budget also included an amendment I offered which guarantees continuous Medicaid coverage for infants, so that we stop the tragic cases of infants losing their eligibility for thoroughly illogical reasons. Thanks to your work and the efforts of many, many people, funding was increased for the Maternal and Child Health Care block grant, for WIC, and for Head Start, where good nutrition and health care services are a priority. And as I am sure you know, historic child care legislation was enacted to provide $2.5 billion in grants to states for child care services and to improve assistance to working families in tremendous need.

I am heartened and energized by these achievements, and hope that they are a sign of much better things to come.

My own plans for the future include pursuing in every way I know how the idea—the imperative—of achieving universal health care for Americans. In addition, the other commission I chair, the National Commission on Children, is in the midst of intensive discussions to come up with a final report by March 31, 1991.*

Because we have not formed our recommendations, I cannot yet report on the ideas and goals that this commission will call for. But I want you to know that the 34 members of this commission have every intention of issuing a clarion call on behalf of children and their families. We are charged with presenting a plan of action to the President, Congress, the governors, and every aspect of the private sector—including the media and civic groups—that lays out what we believe must be done to ensure that far more children grow up successfully and are able to contribute fully to our society. I fully expect that our report will urge specific action to improve the nutritional status and health of children.

I know that I am speaking to kindred spirits and allies today. You are all too familiar with the difficulties and barriers to making real change and progress occur for our children. But you also refuse to ignore the needs before us, and you obviously share my belief in the moral necessity of action.

My plea to you is to help enlarge our ranks. The President has many pressing responsibilities these days, but we cannot wait a day longer to mobilize around the goals of reducing infant mortality and vastly improving child health. Transfer your commitment and determination to your political leaders, your communities, and everyone else. Insist on ambitious action. Our children deserve nothing less, and the future of our nation depends on us to succeed.

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* *Editor's Note: this final report is now available.* National Commission on Children. (1991). Beyond Rhetoric: A New American Agenda for Children and Families. *Washington, DC: U.S. Government Printing Office.*

Needs and Issues in Maternal and Child Health Reaction Panel

Editor's Note: Members of the panel discussed their reactions to the issues and recommendations presented in the keynote address and outlined in the background papers. They presented their thoughts and ideas on these issues based on their experience and concern with the health and nutrition of mothers and children.

Frank Witter, M.D.
Fellow, American College of Obstetricians and Gynecologists

From my perspective as an obstetrician and a member of the American College of Obstetricians and Gynecologists, I would like to see maternal and child health (MCH) services in this country focus more attention on mothers. There is widespread agreement that prenatal care is a major factor in the prevention of infant morbidity and mortality, and that it is cost-effective and strongly and clearly associated with improved pregnancy outcome. In a 1985 report, the Institute of Medicine calculated that providing more adequate prenatal care to low-income, poorly educated women could reduce total expenditures for direct medical care of low birthweight infants in the first year of life by $3.38 for each dollar spent.*

Although the United States has greatly reduced its infant mortality rate since 1965, it still ranks behind 21 other industrialized countries. Many other countries, such as Japan and most Western European countries, provide prenatal care to pregnant women as a social investment, with minimal barriers or preconditions in place. As a result, high proportions of women in these countries begin prenatal care early in pregnancy. I recently asked a visiting obstetrician from Ireland about who did not receive prenatal care in Ireland. He said that tourists were likely to be the only women who did not get prenatal care in his country, since all citizens have access to prenatal care.

Education is the cornerstone of compliance and improvement in pregnancy outcome. Parents must be taught the value of prenatal care for their infant. Barriers to accessing services need to be addressed. Culturally acceptable options for providing prenatal care should be considered, and language barriers should be overcome. Prenatal care should be viewed not as just a medical examination, but rather as an opportunity to teach parenting skills. Breastfeeding promotion should be an integral part of prenatal care.

The background papers for this workshop provide an excellent discussion of nutrition for optimal reproductive health (see pages 113–136). Most obstetricians agree that nutrition services should be part of prenatal care. However, there is a major problem in paying for these services. Additional research on the effectiveness and economic benefits of nutrition care is needed. The WIC program has provided some data showing the benefits of nutrition interventions. When evaluating the effectiveness of the WIC program, however, it must be recognized that sometimes the WIC food package is used to feed the whole family, not just the pregnant woman. Perhaps more dramatic benefits would be seen if the food package were modified to reflect this reality.

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* Committee to Study the Prevention of Low Birthweight, Institute of Medicine. (1985). *Preventing Low Birthweight.* Washington, DC: National Academy Press.

William J. Haskins
Vice President of Programs, National Urban League

The National Urban League is an 80-year-old civil rights and social welfare organization whose mission is to eliminate racial segregation and discrimination in the United States and to achieve parity for blacks and other minorities in every phase of American life. The health of African Americans has always been a concern of the National Urban League.

The 1991 edition of *The State of Black America* describes African Americans as the most unhealthy race of people in the free world. They experience complex health disadvantages which are exacerbated by a combination of poverty, racial bias and ignorance, and lack of access to quality health care. Of these many factors, poverty may be the most devastating and the easiest to isolate. In addition to mortality rates, almost every form of disease and disability is more prevalent among low-income blacks than among whites; at the present rate of progress, it will take until the year 2025 for the average life expectancy of blacks to be equivalent to that of whites (the year 2017 for females and 2038 for males). If current trends continue in the crucial health indicator of infant mortality, black infant mortality rates will never equal white infant mortality rates.

The persistent disparity between the health status of African Americans and that of whites has yet to be reflected in national health policies. The 1990s must therefore be the decade in which the nation finally commits itself to affordable, quality health care for all its citizens through the development of access to universal health care, reflecting the needs of unserved and underserved populations. As you focus your discussions today on nutrition services for mothers, children, and families, consider some of the following action steps which can be taken together to improve the health of African Americans.

1. Develop educational programs to better inform the African American population of the importance of the special health problems they confront and the measures that can be taken to improve their health. Include culturally specific materials appropriate for the literacy level of the population the program serves.

2. Ask local, state, and federal governments to consider mechanisms for funding health care systems for the socioeconomically disadvantaged; the mechanisms should eliminate obstacles to access for this group.

3. Emphasize prevention of disease, combined with a healthy life-style, as a major health strategy.

4. Develop cost-effective screening programs for common diseases such as cancer and hypertension.

5. Develop and promote special programs emphasizing the critical problems of drug abuse and AIDS in the African American community.

6. Identify medical and social intervention techniques for drug abuse victims.

7. Develop clinical programs for newborns to detect sickle cell disease and drug withdrawal symptoms. Provide long-term management of these conditions.
8. Develop programs to ensure adequate prenatal care, including nutrition services, to decrease the incidence of low birthweight and infant mortality.
9. Develop an outreach component for all service delivery programs to ensure the participation of African Americans.

Improving the health of blacks is a job which must involve everyone. All Americans have a stake in this issue since they may pay a high price for the treatment of chronic diseases and disabilities which could have been prevented. Our country needs healthy, productive citizens, and an investment in the health of all Americans is an investment in the nation's future.

Barbara K. Popper, M.Ed.

Resource Specialist

Federation for Children with Special Needs

Collaboration Among Parents and Health Professionals (CAPP)

National Parent Resource Center

I was asked to bring you a parent's perspective on nutrition services for mothers, children, and families. I have been a breastfeeding advocate for 20 years through La Leche League International, and I have been an advocate for parents dealing with medical conditions in their children for 18 years through Children in Hospitals, a member organization of the Federation for Children with Special Needs. The Federation for Children with Special Needs is a coalition of Massachusetts parent organizations representing specific disabilities. From its inception in 1975 as a grass-roots organization of parents and professionals working for children with special needs and their families, the federation has worked to ensure that the voices of families are heard in public policy decisions as well as in decisions affecting the education, care, and well-being of their own children.

The 1982 Surgeon General's Workshop on Children with Handicaps and Their Families recommended that care for children with special health needs be family centered, community based, coordinated, and culturally sensitive. During the last few weeks, I have been asking parents how they felt nutrition related to that recommendation, and what thoughts they would like to share with you. The parents posed the following questions for you:

1. What do dietitians and nutritionists have to do with me as a parent? I shop, cook, and feed my family as my mother did, and to please my husband and children. How are you going to change that? Can I let you?
2. What do you have to offer me? Will you be an advocate for me and my child? How will you help me? When my second child was hospitalized as a 10-month-old breastfed baby, the advice given to me by the staff was to nurse her during visiting hours—8 hours a day—and have them give bottles during the other 16 hours. I found no advocates available to help me stay with my baby, let alone to protect the breastfeeding relationship.
3. What nutrition assessments and interventions can I accept as a parent? Which assessments might cost me my kids? For example, before diagnosis children with special health needs often go through a period of failure to thrive, and parents are sometimes made to feel

that they are at fault. Parents worry about what they tell you and may feel that they are not able to talk honestly with the health care provider. One parent asked, "If I tell them what I can afford to feed my family and my child's growth is inadequate, does my lack of money mean I am neglecting my child? Will I be judged? Will my child be taken away?"

4. In your professional role, can you answer my specific questions about feeding myself and my family? Where will I find you? How will I find you? One mother from a gastrointestinal support group told me that doctors and high technology solutions are offered first. Could you help earlier in the process and maybe prevent some of the expensive medical interventions from becoming necessary?

5. Are you giving consistent advice, and does it match with the other advice I am receiving? One parent suggested that I tell you that your major role should not be just to offer advice, but also to offer realistic assistance with follow-through. They suggested that you make home visits to see the setting before giving suggestions that the family might not be able to implement.

6. What is the appropriate time to give information and advice? In the background papers prepared for this workshop, the advantages of breastfeeding are discussed in the infant nutrition chapter. However, the chapter on women's health (see pages 113–136) does not mention discussions about infant feeding as part of prenatal care. Even our Year 2000 National Health Promotion and Disease Prevention Objectives have placed breastfeeding under infant nutrition and not under maternal health. Our state has taken its objectives for Title V from this list and has also omitted references to breastfeeding, except under its WIC program—one not open to women in general. If health professionals want to influence infant feeding choices, they need to begin in the prenatal period and even earlier.

7. What is the optimal setting for nutrition interventions? One father told me the story of his HIV-positive child in need of hyperalimentation at home. Since neither his insurance nor Medicaid would pay for it, his child was faced with spending weeks of her brief life in the hospital. Fortunately, an advocate was able to arrange for private funding for home hyperalimentation.

8. Which child in the family is your primary concern? As a parent, I have to be concerned about all of my children. Preferential care of one sibling can cause family stress. It is important to recognize that the entire family requires a diet and feeding.

9. Who will finance nutrition services? Will some percentage of the population not be served?

10. Why not increase your efforts to interact with parents? Each of you could benefit from using families as advisors to your work, your program, or your project. The CAPP project has reported on the many advantages of parent groups serving as advisors to hospitals and health departments. Let parents be your allies in developing programs that are family centered and not hospital centered or office based, and in coordinating programs and services so that families do not have to go through a complex maze in order to find services.

Building Coalitions

Lori Cooper
Executive Director, Healthy Mothers, Healthy Babies

How many people here believe that interdependence is as important as self-sufficiency? How many people here have a lot of patience? How many of you have a sense of humor? How many can provide or know where you can find some good leadership? How many of you ever really follow up on what a conference speaker suggests?

If you answered "yes" to most of these questions, you are ready to learn about coalition building. I am going to talk today about some of the components and strategies that have worked for the Healthy Mothers, Healthy Babies coalition, and I hope it will offer you some food for thought.

I have heard it said that a coalition is an unnatural act performed by partially consenting adults with the lights on. . . . Before we look at how to build a coalition, it is useful to ask why we do it in the first place. Why a coalition? There are many reasons. Some basic considerations include:

- To solve or monitor a problem which you or your organization might not otherwise take on due to limited resources. Coalitions offer a means of extending limited resources, and of letting you add something important to an overburdened agenda without putting full resources behind it.

- To exchange or coordinate information. With a coalition, you have more insiders and more outposts. Health care prevention is a constantly changing picture. We must be ever vigilant to both danger and opportunity. These additional information sources facilitate earlier identification of problems and needs.

- To advocate for legislation. There is clout in numbers, and diversity makes a big difference. For example, if nursing home administrators and the American Association of Retired Persons both ask for the same thing, it is more likely to happen than if they each stand alone.

- To put on a special event. There is strength in numbers and in combining resources.

An added bonus is that coalitions offer opportunities for personal and professional growth. Participating in a coalition helps you remember that you are not working in isolation. It helps you do your job better by moving your own or your organization's agenda forward, or by creating and improving interagency cooperation.

The first step for a coalition is to conduct a needs assessment. How a needs assessment is conducted will depend to some extent on the stage of development of the coalition. A crisis may require that a coalition be formed to respond immediately to a problem and not really take time to explore the problem's primary cause or to investigate all of its ramifications. For example, a natural disaster in a community may result in the formation of a coalition to provide food, clothing, shelter, and medical care in a coordinated way. It is unlikely that such a coalition would begin its efforts with a public education program on tornados, or a movement to raise funds for building a seawall.

Some coalitions are formed by visionaries who can not only convey the possibilities for change inherent in combining resources, but can mobilize people around collaboration as the most effective way of advancing social change. Soup kitchens, though necessary in the short term, are not the only possible response to the problems of hunger and homelessness in this country. A coalition that includes organizations concerned with housing, poverty, education, job training, access to health care, and other related issues may help by addressing public policy issues.

In some cases, there may not be a clearly identified problem. It may simply be useful to come together to review how a system works and to consider how to keep it working most effectively. If you are looking at service delivery, you may ask if it is comprehensive, available to all, user-friendly, and rewarding to providers. You may ask if it is affordable for users, the community, or the state, or if the community or state can afford not to afford it.

Sometimes the mere exercise of observing who has collected what data tells you a lot about what you want to know. This is a good point at which to begin to broaden your thinking to include players outside of but related to the health community—corporate, religious, educational. What data have they collected? What reports have they made? How are they framing the problem? Also, remember that we need multicultural approaches at the outset, not as an add-on. The best way to address this is to include representative players in the organizing stages of building a coalition.

So how you do the needs assessment depends on where you start. Collect data or walk through the system with a group of people who work in it and who use it. Most people here are familiar with needs assessment. Just as important, I believe—and frequently left out of coalition building—is what I call strategies assessment.

Strategies assessment is taking a careful look at what has been done before in this arena—both successes and failures. One way to do this is to identify the key players from the past and go and talk with them. Go with a question; do not tell them what needs to be done. Is there anyone here who when approached with the question "Could I ask your advice?" walks away? Here, then, is a powerful tool for coalition building—it is the question, "What do you think?" Listen carefully (another powerful tool).

Be prepared to answer the question "What's in it for me?" You are asking people for commitment and they need to know what they get for their investment. Know what they can bring to the coalition that no one else can. This is really the key. Building a coalition is not simply bringing together a diverse group of individuals or organizations. It is bringing together a diverse group with shared interests; joining resources for a cause, not simply joining resources.

After you have begun to identify key players, stop and think again. Who is missing? Look in all the arenas. Who are the power players in your community or agency? Should they be included? Avoided? We all know that there are some people who will not add to the process of coalition building, and that needs to be thought through.

The concept of "a worthwhile investment" is useful for everyone, but it is especially important for those of you who elect to work with the corporate community. The corporate community makes decisions to participate in such coalitions based on what is termed enlightened self-interest.

They cannot set aside their own agenda, so it is important to work out beforehand any potential conflicts of interest or to establish a process which all coalition members can agree to turn to when a conflict arises. It is easy to see that a breastfeeding promotion coalition may not easily mesh with a formula company, or that a coalition to prevent sexual assault may not wish to accept support from *Playboy* magazine. Harder questions arise in the form of keeping up with who is a subsidiary of whom, determining whose business practices are acceptable, and ascertaining which of these factors are important to coalition members and to what extent.

Another critical component of coalition building is understanding organizational perspective. Start by learning the history of organizational interaction. Sometimes people carry on turf battles out of loyalty to leaders who may no longer be involved in the organization. When you solicit members, acknowledge that you understand why they may not have worked well with some of your other members in the past, and explain that you want to address the issue considering both perspectives, since both are necessary to the operation of the system with which you are concerned.

But you and those you work with really must let go of historical grudges. It will not work to come to the table having set aside a grudge but being ready to use it as a reference point at the first sign of conflict.

It is also important to build support for the coalition at all levels of the organization—top leadership as well as support personnel. Explain the coalition and give people a chance to support the idea so that it is not just extra work for them, with no real context.

Now you have gathered some folks together, identified an area of mutual need, and determined ways to work together to solve problems that are part of the coalition's common interest. That is about nine months' or a year's work. How do you keep the coalition going?

Perhaps most important is defining the coalition's mission according to its capacity. This may not always be the most effective solution to a problem. For example, it may be much quicker to pass an ordinance against adolescent smoking than to hold classes that encourage self-valuation and health promotion among adolescents. But is the coalition able or ready to do advocacy? Do they have an entree into the school system, or do they already have their own educational system in place? This is a hard reality, but it is an opportunity to be creative.

Communication is vital. Determine which means is best for your coalition (e.g., meetings, newsletters, or phone chains) and make it reliable.

Some rules are necessary, but do not get bogged down in the process of defining them. Set rules you can agree upon for meetings. Develop committees according to your members' interests, not according to an abstract model.

I spoke earlier about the importance of leadership. Even good leaders need to have their roles clearly defined. It is useful to develop job descriptions and to set terms of service. It may help to separate dual roles normally accorded to leaders to better match their abilities with the roles assigned to them. For example, you may have an individual who is a strong delegator and a weak detail person. You could define one person's job as running the meeting, and another could supervise or coordinate assignments or production.

How are leaders evaluated? This gets back to setting clear goals. If improved communication is the goal for a coalition, the number of members who have joined may be relevant. If the goal is a change in the prenatal care system, the number of members is not as important.

Setting clear goals is the first step in meaningful evaluation. Build in checkpoints at the outset to stop and look at what has been accomplished, what has been the cost, and what has changed as a result. If a coalition succeeds, do not be afraid to call it a success and disband it. If it works, do not be afraid to continue to explore the power of cooperation and collaboration in tackling new problems or aspects of the original problem around which the coalition formed.

Remember that coalitions are made up of people, and how far they go depends on us as individuals working together. George Washington Carver said it well: "How far you go in life depends on your being tender with the young, compassionate with the aged, sympathetic with the striving, and tolerant of the weak and the strong. Because someday in life you will have been all of these."

The Dynamics of Change

David B. McCallum, Ph.D.
Deputy Director, Center for Risk Communication
Associate Professor, Environmental Studies, Columbia University

Food is a cultural experience, an integral part of our lives. High-fat foods have been part of that cultural experience. The general public is receptive to information about health and nutrition, but is often resistant to change. They are interested in the concept of health and good nutrition, but respond to other factors, including taste, time, economics, and tradition. When attempting to change eating behaviors, we must consider nutrition in a broad context that includes culture and food availability, purchasing, preparation, storage, and consumption. An integrated approach considering all factors that affect food choices is necessary.

What can you do to make change happen? You can create nutrition programs for mothers, children, and families that are based on an integrated approach and that are self-sustaining. Address the following factors: the availability of food; the skills of the target audience in selecting and using foods; and, most importantly, making the food fit in with their eating habits. Teach community groups how to run the program themselves.

You can teach businesses how to make money on good nutrition. Focus efforts on consumer satisfaction and create a consumer market for healthy food products. The health community can form coalitions with businesses to market healthy eating and healthy food products but must be careful in choosing products and partners.

You can compile data on the need for and benefits of change and on programs that work. Data are some of the most effective catalysts for change.

You can advocate for legislation and regulations that promote good nutrition information to support consumer choices.

You can collaborate and build consensus in the health community. Join forces and capitalize on combined energy and resources to work toward a common goal.

You can recognize the power of the media and try to use it. Health professionals can assist the media by translating science into lay terms. Remember that media consist of more than news and public affairs; advertising and entertainment also have a powerful impact on public opinion and behavior. Be ready for a significant event that creates a political environment which allows for forward movement. The event calls public attention to the need for change.

You can utilize marketing principles in your efforts to bring about change.

Always evaluate your efforts, but do not expect too much too soon and do not become easily discouraged. For example, it has taken 30 years to change smoking rates and attitudes toward smoking in this country.

This workshop provides an opportunity for organizations to join forces and capitalize on their combined energy and resources to identify gaps and coordinate efforts in policy and program development in nutrition services for mothers, children, and families. The 10 challenges facing organizations working together to promote change are:

1. Recognize the vested interests and differences in the organizational structure of each organization, and find areas where group interests intersect.
2. Recognize the need for negotiation and compromise.
3. Obtain policy-level support within each organization in order to have the authority to work on the organization's behalf.
4. Develop a rationale within each organization based on the organization's agenda for supporting activities.
5. Develop in each organization a willingness to share credit and credibility.
6. Acknowledge the characteristics of government versus nongovernment agencies, and articulate differences in order to avoid roadblocks.
7. Keep constituents informed since policy systems (power within organizations) respond to constituents.
8. Constantly nurture channels of communication between and within organizations.
9. Recognize the importance of timing. Plan short-term and long-term activities, but take advantage of unplanned events and capitalize on opportunities.
10. Communicate with those concerned at all levels, up, down, and throughout the system. Cooperation is at least three-dimensional.

Organizations and Opportunities for Action Panel

Editor's Note: Members of the panel summarized the accomplishments of the workshop and discussed how the goals and activities of their associations relate to implementation of the work group recommendations. They challenged the participants to take leadership roles in their organizations to implement recommendations and support an integrated approach to problem solving and program development in maternal and child nutrition.

Nancy S. Wellman, Ph.D., R.D.
President (1989–1990),
American Dietetic Association

The American Dietetic Association (ADA) is an action-oriented professional organization that promotes optimal health and nutrition status of the population, and provides direction and leadership for quality dietetic practice, education, and research. With over 61,000 members, ADA is the largest association of nutrition and dietetic professionals in the United States. Its membership includes more than 90 percent of all registered dietitians in this country.

ADA has a strong commitment to maternal and child health issues and believes that the discussions at this meeting will help focus attention on specific areas where ADA can help improve nutrition services for mothers and children. In the work group recommendations, ADA is listed more than 40 times as one of the organizations which could be involved in implementing the strategies for action. This means that our representatives have more than 40 ideas to present to the association for possible incorporation into our short- and long-range action plans. Current ADA activities, such as the following, offer numerous opportunities for implementing many workshop recommendations.

Position Statements

Position statements represent the viewpoint of ADA on a particular subject at a particular time and provide a vehicle to influence policy and service delivery. ADA has position statements on nine issues related to maternal and child health, including: Promotion of Breastfeeding, Child Nutrition Services, Nutrition Standards in Day Care Programs for Children, Nutrition in Comprehensive Program Planning for Persons with Developmental Disabilities, Nutrition Intervention in the Treatment of Anorexia Nervosa and Bulimia, Nutrition Management of Adolescent Pregnancy, Children with Special Health Care Needs, Impact of Flouride on Dental Health, and Competitive Food in Schools. In addition, ADA has worked with other associations to develop joint position statements or to endorse the positions taken by other associations.

Legislation

The association has an active legislative program and currently has three staff positions in its Washington, DC, Division of Government Affairs. Legislative activities of staff and members include testimony and comments at congressional hearings, advocacy, a legislative newsletter, an annual legislative symposium, and participation in various health, food, and nutrition coalitions to promote action which will benefit the population. ADA has actively worked on legislation affecting mothers and children, such as that related to child nutrition programs, child care, nutrition monitoring, food labeling, and the like.

Coalition Building

Through its Alliance Program, ADA is actively working to strengthen its ties with other associations. Currently the association has established alliances with over 70 organizations. ADA's membership in the Maternal and Child Health Interorganizational Nutrition Group is an indication of its commitment to maternal and child health issues and represents an important opportunity for ADA to strengthen its alliances with other maternal and child health organizations.

Reimbursement for Nutrition Services

ADA has a very active committee on Nutrition Services Payment Systems (NSPS). This committee has been working with the Health Care Financing Administration and other federal agencies to develop guidelines for reimbursement for nutrition services. Data are being collected to answer the questions decision-makers ask about nutrition services (these are outlined in Economic Analysis of Nutrition Care Within Maternal and Child Health Services, pages 303–316). The help and support of other associations in improving the financing of nutrition services is needed and welcomed if quality nutrition services are to become a consumer right.

Public Education

Through its Media Relations Program, ADA has developed a network of media spokespersons at the national and state levels. The media program, including the ADA Ambassadors, provides information to the public on maternal and child nutrition. We recently established the National Center for Nutrition and Dietetics (NCND), which is the public education initiative of ADA and its foundation. Because NCND provides nutrition information to practitioners and to the general public, it offers another important opportunity to deliver more information on maternal and child nutrition. ADA could act on many of the recommendations and strategies from this workshop through its public education programs. For example, through its public education efforts, ADA could address the infant workgroup recommendation 10 (page 25) and also act on strategy 10.5 (page 25) by eliminating the baby bottle as a symbol for the baby in all ADA publications.

Credentialing

ADA establishes and enforces standards for academic training and practice in clinical nutrition, food service management, and community dietetics. The Commission on Dietetic Registration, ADA's independent credentialing agency, registers individuals who have met standards for competency to practice in the profession, including successful completion of a certification examination and ongoing continuing professional education. The recommendations and strategies for action related to training and continuing education in maternal and child health could be addressed by ADA and the Commission on Dietetic Registration.

Continuing Education

ADA has many vehicles for providing professional continuing education in maternal and child health. These include annual meetings; workshops at the national, state, and district levels; the *Journal of* *the American Dietetic Association;* and other continuing education publications.

Communication

ADA communicates with its members through delegates and legislative representatives of the 50 state dietetic associations, the District of Columbia, Puerto Rico, and the American European Dietetic Association. Most state associations are divided into districts. There are about 220 district associations. The 22 ADA practice groups related to specialty areas of dietetic practice are another important dimension of the ADA organization. For example, seven practice groups relate to the maternal and child health population, including: Public Health Nutrition, Dietetics in Developmental and Psychiatric Disorders, Pediatric Nutrition, School Nutrition Services, Nutrition Education for the Public, Nutrition Educators of Health Professionals, and Dietetic Educators of Practitioners. These practice groups provide opportunities for communication and coordinated action on maternal and child health issues.

For the past two years, ADA has had a leadership role in the planning of this national workshop through its active participation in the Maternal and Child Health Interorganizational Nutrition Group. This workshop has provided a forum for identifying needs and issues in maternal and child health and for discovering ways in which organizations and agencies can work together to improve maternal and child nutrition. We will take ideas and recommendations from this workshop back to ADA for consideration and appropriate follow-up action. ADA and its members stand committed to action on behalf of mothers and children through better nutrition.

Terry F. Hatch, M.D.
Member, Committee on Nutrition, American Academy of Pediatrics

The American Academy of Pediatrics (AAP) is a professional association committed to the attainment of optimal physical, mental, and social health for all infants, children, adolescents, and young adults. To this end, the members of AAP dedicate their efforts and resources.

Goals of AAP:

Professional education: Provide and promote medical education which meets the needs of academy fellows, residents, undergraduate students, and other health professionals.

Advocacy for children and youth: Serve as advocates for infants, children, adolescents, and young adults and their families in all matters pertaining to health care. Serve as a principal source of child health care information to other organizations and to governments.

Advocacy for pediatricians: Promote the pediatrician as the best qualified professional to provide health care to infants, children, adolescents, and young adults.

Public education: Conduct and promote public education programs that focus on the health needs of infants, children, adolescents, and young adults.

Membership service: Provide benefits and services to assist AAP members in meeting the needs of infants, children, adolescents, and young adults.

Research: Provide leadership and support for basic and applied research relevant to health care for infants, children, adolescents, and young adults.

Members of the academy participate in activities related to these goals at the local, state, and national levels. In their role as advocates for children, local pediatricians serve individual children and families. They also serve communities by meeting with and advising community groups, serving as physicians for school athletic teams, and fulfilling leadership roles as volunteers in community organizations and on advisory councils. At the state level, they interact with state medical societies and serve on committees or councils that address statewide or regional issues concerning infants, children, adolescents, and young adults.

At the national level, AAP provides leadership in the education of health professionals and the public on pediatric health needs. In addition to sponsoring numerous continuing education programs for pediatric health professionals, the academy publishes reference texts on the latest pediatric health guidelines, resource materials for practice management, reports and policy statements, and patient education materials. AAP also serves in an advocacy role at the national level through its promotion efforts for legislation that affects the health of children and families.

AAP currently has 42 councils, committees, and task forces that address specific areas of health care for children. In addition to the Committee on Nutrition, which focuses on the science of pediatric nutrition, several other AAP committees, including the Committee on Children with Disabilities and the Committee on School Health, will be interested in the recommendations of this workshop; however, I am not empowered to speak at this workshop on behalf of other AAP committees.

As the representative from the AAP Committee on Nutrition, I hope to discuss issues and recommendations for nutrition services in the broad arena of maternal and child health; to carry back to my organization the many ideas generated for review and response; to develop plans for coordinated action on the part of my organization and other organizations and agencies; and to implement the plans or actions.

There are many recommendations from this workshop that AAP will review, and look for opportunities to collaborate with other organizations in implementing strategies for action. Access to medical care continues to be a priority issue of AAP. The academy is an advocate of breastfeeding and has refused to accept grants from industry when they present a conflict of interest regarding breastfeeding promotion. Many of the recommendations from this workshop involve the training of health professionals. The academy does have an impact on the training of pediatricians and promotes the concept of interdisciplinary care. The academy is also supportive of efforts to recruit minorities in the medical profession. We are also interested in exploring ways to increase the involvement of consumers in the planning and development of programs and services.

The academy appreciates the opportunity to be an active participant in this workshop. We look forward to being active participants in the dissemination of the workshop recommendations and to respond to the opportunities presented.

Richard P. Nelson, M.D.
President, Association of Maternal and Child Health Programs

The Association of Maternal and Child Health Programs (AMCHP) represents state agencies who administer the Title V maternal and child health activities, including programs for children with special health care needs, in the 59 states and territories. AMCHP includes primarily the leadership of state MCH programs, but also other individuals from the broader MCH community who are interested in the activities of this special federal-state partnership.

The state MCH programs are generally administered within departments of health, although Title V programs for children with special health care needs are sometimes located in other agencies or entities, such as state universities. State MCH programs during fiscal year 1991 are administering nearly $500 million in federal MCH block grant funds, and over $1.2 billion in federal and state funds which provide or assure health care and related services for women and children. In 1989, Congress substantially amended Title V to give new emphasis to the role of state programs in assuring access to health care for women and children. The task of assuring access is complex. Access, of course, has several components. Most policymakers consider the availability of a financing source the most critical element of access. Financing is essential, but is no longer the primary rationale for a federal-state MCH program. Note that I use the word "primary." The financing of care remains an important role for state Title V programs, especially for select populations in certain states. For example, in several of the southeastern states, approximately one-third or more of all pregnant women received prenatal care funded entirely or in part by state MCH programs. As another illustration of the importance of current Title V financing of care, there are innumerable medical specialty teams and services for children with special health care needs funded by the state programs.

Yet Congress and the states have not elected to utilize Title V as the major vehicle to expand the financing of health care for low-income women and children. In the short term, the Medicaid program is filling that role. The 1990 amendments to Title XIX would eventually extend Medicaid eligibility to all children living in households with incomes below the federally designated poverty level (and to pregnant women and infants with incomes exceeding that level). As we have heard at this conference, Congress will be engaged in a protracted search for an even more inclusive financing program, shaped largely by the political will of the nation's citizens. We should not expect that Title V will be at the core of the financing mechanism.

Instead, Title V has a different, although very related, role: to assure that a system of services appropriate to the health care needs of women and children is available to them. This role is not really new, but it sharpens the public health focus of the programs. Assurance can include the recruitment and patronage of providers to serve the maternal and child health population, the development of or emphasis on standards of care to improve the quality of services, and the identification of persistent or emerging needs for services in this population. Assurance can also include the direct provision of services when those services would otherwise not be available.

Nutrition Services and the Mission of Title V

The nutrition of women and children is an integral component of their health. Therefore it is logical that assuring access to nutrition services should be a component of a comprehensive system of health care services. Simply stated, this is the rationale for the inclusion of nutrition services in the scope of activities planned by the states. Within most health departments, these efforts should be undertaken in full collaboration with the director of public health nutrition, the director of the WIC program, and the director of public health nursing. Interagency efforts, especially with appropriate personnel in state departments of education and social services, are also essential to ensure the continuity of health care services for schools and community programs. Finally, there must be communication and the seeking out of support from all relevant professional groups and medical centers providing care to women and children.

In the real world of allocation of state maternal and child health resources (and related resources, especially reimbursements through the state Medicaid plan), the establishment of spending or staffing priorities requires a planning process. This process may be overtly political, particularly when groups interested in certain populations or issues conclude that their priorities are inadequately supported. The slow growth of public funding for MCH services during the past decade has limited the expansion of state MCH programs. Frequently, the initiation or growth of a service requires the elimination, reduction, or constraint in growth of an existing service or activity. Such changes require the justification, advocacy, and rational planning of new or augmented services and activities. If many of the priorities developed in this workshop related to improvement in statewide nutrition services are to become a reality, I encourage your organizations, when appropriate, to become active in state MCH planning.

State planning occurs through a variety of mechanisms in the various states. You may contact the director of the maternal and child health programs or the program for children with special health care needs to learn about the process in individual states.

On the national level, the guidance prepared by the federal Maternal and Child Health Bureau to assist state maternal and child health programs in preparing their annual application for MCH block funds is a critical force in shaping the scope of state program activities. Attention to nutrition issues in this process can result in extensive change throughout the United States.

AMCHP has appreciated the opportunity to participate in this coalition effort. I pledge that we will work closely with the Maternal and Child Health Bureau to be certain that the leadership of state MCH programs considers the issues and actions recommended by the work groups at this meeting.

We are committed to improving the nutrition of American women and children.

Background Papers

Nutrition Services in the Maternal and Child Health Program: A Historical Perspective

Mary C. Egan, M.S., M.P.H., R.D.,
National Center for Education in Maternal and Child Health
Allan C. Oglesby, M.D., M.P.H., San Diego State University

Contact with the past allows a group to measure itself against that past and challenge its present vitality. This thought, expressed some years ago by a religious leader, has some impact for all who are involved in the administration, planning, and delivery of nutrition services in maternal and child health (MCH) programs. As Dr. Eliot, an early pioneer in MCH, said, "A historical look is always needed to give perspective and a broad framework for current planning."[1] Unfortunately, human nature and historical files are such that it is often impossible to easily access information about "what went before," and thus the experience of the past is usually lost or underutilized.

The objectives of this chapter are (1) to help those concerned with nutrition services in MCH programs to know the past and to use that knowledge to challenge the present vitality of nutrition services in health programs for mothers and children, and (2) to provide a framework for planning and improving such services in the future.

The chapter will discuss several themes underlying the evolution of nutrition services in maternal and child health (MCH) in the United States, describe some of the changes occurring in the programmatic and administrative aspects of nutrition services over time, and highlight some of the important milestones in the development of MCH nutrition services, with particular attention to events occurring in the Title V MCH Program. It will also identify several recurring issues in maternal and child nutrition services, and finally will offer a few recommendations for consideration.

Underlying Themes

As one reflects on the development of nutrition services in the MCH Program in the United States, several underlying themes become apparent. These include:

The cyclic nature of development; or, "What goes around, comes around"

Frequently, over the years, a particular nutrition service is heralded as new and as a panacea for the nutrition needs and problems of the times, when in fact it is a reincarnation of an idea of the past. For example, the assessment of the nutrition status of children did not emerge as a national and state concern in health services for the first time in the 1960s, 1970s, and 1980s. Rather, it was a concern of the early 1920s, when nutrition status studies of children were undertaken by the Children's Bureau in a mountainous area of Kentucky and the urban center of Gary, Indiana.[2] The concern continued into the 1930s, when at the first Milbank Memorial Fund Round Table in Nutrition (1937),[3] it was noted that the aspect of nutrition most seriously neglected and most in need of immediate development was its application to public health. Specifically emphasized was a need for satisfactory methods for the appraisal of nutrition status. Even in the 1940s, activities included mobile field units established by the Public Health Service in four geographic areas of the United States to conduct nutrition appraisals of school children or members of families in the general population or industry, and to provide consultative service to state health departments in regard to nutrition appraisal studies.

Another example is the concept of offering food assistance to high-risk groups as an integral part of health care programs. This idea was not "born" in the 1960s and the 1970s with the advent of the Special Supplemental Food Program for Women, Infants, and Children (WIC). Rather, it was an important dimension of health care even in the 1800s: Lillian Wald included milk stations in the program of the Henry Street Visiting Nurse Association which she established in New York City (1895), and Rochester, New York, became the first municipality to provide milk stations for those in need (1897).[4]

The parallel development of MCH nutrition services and the broad MCH Program

The development of nutrition services in health care programs for mothers and children has usually occurred in tandem with the development of the broad MCH Program. For example, in the early 1900s, when the American Child Health Association and the Commonwealth Fund developed child health demonstration projects, nutrition clinics were established as an outgrowth of the effort. Likewise, when Title V of the Social Security Act was enacted in 1935 and provisions were made for a maternal and child health program and crippled children's services (CCS) in each state, the numbers of public health nutritionists employed increased, and nutrition services in public health agencies were expanded across the nation. Also, when Title V was amended in 1967 to provide for neonatal intensive care projects, perinatal nutrition services were strengthened, and training in perinatal nutrition was offered to the various disciplines involved.[5]

This "in tandem" development of the broad MCH Program and MCH nutrition services has important implications for nutrition providers. Specifically, they need to be knowledgeable about developments and changes in the broad MCH Program in order to be able to "seize the moment" to strengthen and improve MCH nutrition services.

The interrelatedness of events; or, The "ripple effect"

The "ripple effect" of a single event in history has long been recognized, and it is as apparent in MCH nutrition services as it is in other arenas of life.

The interrelationship between developments in mental retardation programs, Maternity and Infant Care (M&I) Projects, and WIC illustrates the phenomenon.

In 1957, when Congress earmarked a portion of the Title V MCH appropriation for demonstration programs for diagnosis and treatment of children who were mentally retarded, more attention began to be paid to prevention of mental retardation.[6] This development was followed by the *Report of the President's Panel on Mental Retardation* in 1962, which focused on the relationship of poor maternity care, poverty, premature birth, and mental retardation. It was this report that led to the 1963 amendments to Title V of the Social Security Act which provided for the development of the Maternity and Infant Care Projects and the further expansion of the mental retardation projects started in 1957. The 1963 amendments represented the first MCH programs under Title V (which had always had a rural emphasis) to be extended to the large cities in response to the major population shifts occurring in the nation. Focused on at-risk mothers and infants, especially in low- income areas, the projects provided comprehensive health care which included nutrition services. It soon became apparent that many of the mothers and infants served in the projects lacked food basic to the maintenance of health. Reasons for this included restrictive eligibility standards for food stamps and income assistance, lack of transportation to travel to multiple locations for services, and limited information about resources and how to access them. Recognition of this widespread problem led pediatric and nutrition staff of the federal MCH agency to propose to the United States Department of Agriculture (USDA) that special food assistance be made available to these vulnerable groups and that health care providers be allowed to prescribe food, just as they did medications, for reasons of health.[7]

In response, the USDA developed the Supplemental Food Program for Low Income Groups Vulnerable to Malnutrition. This program provided nutritious food packages which could be prescribed by health care providers on the basis of health need and income level. The food packages were distributed in many of the health care settings or in close proximity to them. Experience with this initial effort led the USDA to design and pilot-test five Food Certificate Programs in different geographic areas. This approach was intended to overcome the problems encountered by the health agencies and the clients (e.g., shipping, storing, distributing, and transporting actual food packages). Eventually, the WIC program as we know it today emerged from these developmental efforts. Thus it was a single event, the issuance of *The President's Report on Mental Retardation* (1962), which triggered the legislation providing for the Maternity and Infant Care Projects (1963) and which eventually led to the creation of a supplemental food assistance program for low-income mothers, infants, and children (1968).

The influence of the "climate" of the times

Maternal and child nutrition services did not develop in a vacuum, but rather were a product of the times.[8] For example, in the years of World War I, a significant number of young men were rejected for service because of health deficits, many of them nutrition related and preventable. Consequently, more attention was focused on nutrition as a critical factor in growth and development, as illustrated by the opening drive of the Children's Year Campaign in 1918, which focused on the weighing and measuring of infants and children of preschool age.[9, 10]

The Great Depression of the 1930s resulted in an increase in the number of undernourished children and families, and priority was given to emergency relief and food assistance. In World War II, mothers went to work in defense plants, and as a result the need for group care of children increased.[11] The Office of Defense, Health and Welfare Services requested that the Children's Bureau prepare a publication to help community organizations with the feeding of young children in group care. Thus the first publication, *Food for Young Children in Group Care*, was prepared.[9]

Calls for action from the national level also had an impact on maternal and child nutrition services. For example, nutrition was very prominent in the deliberations of the White House Conference of 1930, which was concerned with child growth and development. A volume entitled *A Report on Nutrition Services in the Field*, written by some of the country's leading nutritionists in health and welfare organizations and educational institutions, summarized the recommendations from the conference. The National Nutrition Conference of 1941 influenced the establishment of the Recommended Dietary Allowances; the 1969 White House Conference on Food, Nutrition and Health brought an expansion of federal food assistance; and more recently, the 1984 Surgeon General's Conference on Breastfeeding and Human Lactation stimulated expansion of breastfeeding promotion efforts.

It is important to use a "wide lens" in viewing nutrition services in order to encompass the many environmental changes and happenings which impact on such services. Awareness of the themes described above—the cyclic nature of the development of MCH nutrition services, their parallel development with the broad MCH Program, the interrelatedness of events or the ripple effect, as well as the influence of the "climate of the times"—can enhance one's understanding of how and why MCH nutrition services of the present came to be.

Changes in the Programmatic and Administrative Aspects of MCH Nutrition Services

A historical review can also help illuminate some of the changes occurring in such parameters as the focus or emphasis of MCH nutrition services, the organizational locus of service, the methods of service delivery, the type of financing, the training of personnel, and many other aspects.

Changes in focus/emphasis

After the end of the Civil War, child health became a more defined entity and also an increasing public concern.[8] Infant mortality rates were exceedingly high, 288 per 1,000 live births in 1880. Reports from New York City highlighted the relationship between milk, diarrhea, dysentery, and other diseases of children. As a result, sanitation and prevention of communicable disease received priority. Parents were taught about child hygiene, including child feeding. By the late 1880s and early 1900s, milk stations became a channel for these educational efforts, as did the local health agencies which were being established.[4]

In 1912, the federal Children's Bureau was established to investigate and report upon all matters pertaining to the welfare of children and child life among all classes of the people, and especially to investigate questions of infant mortality, birth rate, orphanages, juvenile courts, desertion, and dangerous occupations; accidents and diseases of children; and employment and legislation affecting children.[2, 6] The Bureau's early publications—*Prenatal Care* (1913) and *Infant Care* (1914), which were directed to rural as well as urban populations—provided guidance to health professionals and the public about maternal and child care, including nutrition and infant feeding.

As the specialty of pediatrics began to develop in the late 1800s, and the principles of growth and development were further elucidated in the early 1900s, more attention was directed to the assessment of growth and the role of nutrition in growth and development. The early Children's Bureau publication, *What Is Malnutrition?*, written by Lydia Roberts, was issued as a follow-up of the 1919 Children's Year Campaign. It was revised in 1927 when the emphasis was shifting from malnutrition to optimum development—from nutrition clinics and classes for the already malnourished to well child supervision—and to health education, including nutrition and school lunches for all children. Eventually *What is Malnutrition?* emerged as *Nutrition and Healthy Growth*, a Children's Bureau publication used well into the 1960s.[9] Longitudinal growth studies such as those carried out by Harvard University, the Colorado Child Research Council, and the University of Iowa for many years supported the emphasis on growth and development, including the publication of growth charts.

With the continuing advances in medicine and technology and greater recognition of the role of nutrition in treatment and rehabilitation of disease, more attention was directed to diet therapy and clinical nutrition in MCH nutrition services. This was accelerated by (1) the development of the comprehensive health care projects for mothers and children and of the clinical mental retardation programs, (2) the changing nature of the case loads in the state crippled children's services, which came to include many conditions other than orthopedic, and (3) the funding of specialized "regional" centers of care for pediatric pulmonary disease, neonatal intensive care, and other conditions.[10, 11]

The next major shift in emphasis occurred with the significant changes in the causes of morbidity and mortality in the United States and the recognition that many of the chronic diseases in adulthood had their antecedents in childhood. Thus MCH nutrition services began to encompass more activities related to health promotion and disease prevention. In recent years (the 1970s to the 1980s) the accelerated expansion and increased funding for WIC has resulted in further shifts in emphasis in MCH nutrition services. Significant amounts of time and attention are being redirected to certification of eligibility for food assistance and to provision of mandated nutrition education, often with a concomitant decrease in other aspects of MCH nutrition services (e.g., dietary counseling, assessment of nutrition status of mothers and children in the population who are not WIC eligible, and comprehensive nutrition program planning).

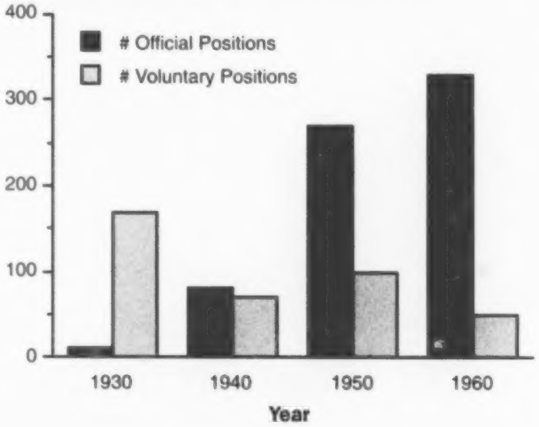
Further change in focus/emphasis in MCH nutrition services has occurred in the past two decades as new concepts in the provision of services to disabled children have emerged, including a shift toward community-based, family-centered, and comprehensive services. These conceptual changes, coupled with the enactment of legislation such as the Education for the Handicapped Act (1975) and its amendments (1986), have expanded services for these children and have resulted in greater attention to the availability, accessibility, and quality of nutrition services provided to children with special health care needs.

Changes in organizational locus

In the late years of the 19th century and the early part of the 20th century, most of the nutrition services for mothers and children emanated from voluntary agencies and private foundations rather than from the public sector. This was true even though 14 states had established health departments by 1877. Figure 1.1 describes some of the changes in organizational locus of nutrition services which occurred over time.

From the early 1920s to 1935 when it was disbanded, the American Child Health Association was the leading national organization in child health work (it was first

Figure 1.1: Nutrition positions in official and voluntary health agencies, 1930–1958 (estimated)



Source: Unpublished data in the nutrition files, Maternal and Child Health Bureau, Health Resources and Services Administration, Public Health Service, U.S. Department of Health and Human Services.

organized in 1909 as the American Association for the Study and Prevention of Infant Mortality). Initially focused on birth registration, nursing, social work, and medical prevention, its scope was eventually broadened to deal with such issues as starvation and dependency. For example, the association's joint efforts with the Commonwealth Fund resulted in the development of child health demonstration projects and eventually led to the organization of nutrition clinics for children.[7]

Another voluntary agency prominent in the development of public health nutrition services was the American Red Cross, which provided funds for the demonstration of nutrition services. Many of the Visiting Nurse Associations (VNAs) also employed nutritionists to provide consultation to nurses and counseling to the families served. While the VNAs in recent years have given more attention to the care of the chronically ill, in the early years they focused on maternal and child health.

Figure 1.2: Development of nutrition positions in state health agencies (estimated), 1936–1987

Year	Number of Positions
1936	11
1939	43
1941	94
1947	170
1951	180
1955	200
1965	265
1967	320
1978	1,700[a]
1985	1,128
1987	721

Source: Data available in files of Maternal and Child Health Bureau, Health Resources and Services Administration, Public Health Service, U.S. Department of Health and Human Services.

[a] Only data available combined state and local health agency positions.

Other health and welfare agencies such as the Community Service Society of New York, the Children's Fund of Michigan, the Elizabeth McCormick Fund, the Infant Welfare Society of Chicago, and others made significant contributions to the development of nutrition services in MCH programs.[7]

It was the Sheppard-Towner Act of 1921 and Title V of the Social Security Act of 1935 which provided for federal grants to the states for the development of maternal and child health services that resulted in the shift of the organizational locus of nutrition services from the voluntary to the public sector. The addition of nutritionists to state and local public health agencies had a considerable impact on the involvement of official agencies in the provision of nutrition services.[12] By 1938, 17 state health agencies employed nutritionists, while in 1945 the health departments of all but three states made budgetary provision for the employment of one or more nutrition consultants. Figure 1.2 describes the development of nutrition positions in state health agencies over a period of five decades. As the state nutrition programs grew in size and scope, the informal sessions which had been arranged for the chief state nutritionists for some years by the federal MCH agency no longer provided adequate opportunity for joint planning and sharing of experience. Consequently, the chief nutritionists from the states organized themselves in 1952 as the Association of State and Territorial Public Health Nutrition Directors (ASTPHND), an affiliate of the Association of State and Territorial Health Officials.[14] The first meeting of ASTPHND was held in November 1953 in New York City. Bertlyn Bosley, Chief Nutritionist, North Carolina State Health Department, served as acting president, and 24 members were present.

More recent years have brought growth in the private practice of nutrition in the United States. Significant numbers of dietitians and nutritionists now work as private practitioners and contract with individual health professionals, agencies, and organizations in their communities to provide nutrition services. It is not unusual to find private practice resources in nutrition being utilized by such programs as Head Start, group medical practices, specialized clinical programs, and other such entities serving mothers and children.

Changes in methods of delivery

Over a span of 40 years (1920–1960), most of the MCH nutrition services were "indirect"; that is, nutritionists worked primarily with and through other health care providers who delivered nutrition services to clients. Rationales for this approach included the limited availability of nutrition personnel, a desire to protect clients from multiple advisors, and the benefits to be derived from the integration of nutrition services into the other aspects of health care.

A major shift in the methods of delivering nutrition services occurred in the 1960s with the advent of the comprehensive health care programs for mothers and children—the Maternal and Infant (M&I) and Children and Youth (C&Y) Projects. Rather than delivering services indirectly through other health professionals, nutrition personnel assumed more responsibility for direct service to clients. Reasons for this change included the multiple and complicated nutrition needs and problems of the high-risk clients served; the changes which had occurred in the nutrition training of health professionals, especially nurses; and the limited amount of time available to busy care providers to provide the in-depth nutrition counseling required by many clients.[13] It was the M&I and C&Y Projects that pioneered the development of the concept of a nutrition care plan, the definition of the basic elements of comprehensive nutrition services, and the development of a classification code for categorizing nutrition problems and conditions. These accomplishments were due largely to the increased number of nutrition personnel working in these clinical settings.[13]

Changes in funding sources

In the early part of the 20th century, private sector funds were the major source of support for MCH nutrition services. However, this began to change in 1935 with the enactment of Title V of the Social Security Act, which made federal and state matching funds available in the states. For many years, Title V maternal and child health program funds were the primary, and often the sole, source of support for MCH nutrition services in the states. It is noteworthy that state monies gradually became more available for MCH nutrition services as the regional nutrition consultants of the federal MCH agency encouraged the states to allocate some of their own funds for this purpose.

Other federal health funds for nutrition became available in 1945 when the Public Health Service (PHS) established mobile nutrition field units to conduct nutrition appraisals and assist the states in further developing nutrition programs, particularly the nutrition appraisal aspects.[15] Although the PHS initiated special programs in the 1950s which had a nutrition component (e.g., diabetes, chronic illness/aging, and nursing homes), most of these programs were not targeted toward the MCH population.

In the mid-1950s, however, the Indian Health Service, PHS, began to develop a nutrition program and employ nutrition personnel to serve Native Americans, many of whom were mothers and children. As a result of the War on Poverty in the 1960s, sources of public funds for health care began to diversify. Some Office of Economic Opportunity programs, such as Head Start, included a major nutrition component, while others, such as the Community Health Centers Program and the Family Planning Program, often included some nutrition care as a part of their health services for mothers and children.

Public funding support for nutrition services extended beyond federal health programs to include programs administered by other federal health agencies. For example, programs administered by the United States Department of Agriculture (USDA), such as the National School Lunch Program (1946), the Food Stamp Program, the Child Nutrition Act (1966), the Special Supplemental Food Program for Women, Infants and Children (1972), and the Nutrition Education Training Program, or NET (1977), were major funding sources for food assistance and nutrition education.[10]

Programs administered by the U.S. Department of Education through the Education of All Handicapped Children's Program (1975) and its subsequent amendments provided for including nutrition personnel as providers of services to children with special health needs. The Health Care Financing Administration, which administers Title XIX of the Social Security Act (Medicaid), has also been a source of funding for nutrition services for the Medicaid-eligible population in some states. For example, nutrition services have been added to some state Early and Periodic Screening, Diagnosis, and Treatment (EPSDT) programs. Recent amendments to Title XIX gave states the option of extending an expanded service package, including nutrition counseling, to pregnant women, and a significant number of states are providing nutrition services as a part of an enriched maternity services package.

While public funds have eclipsed private sector funds as a source of support for MCH nutrition services for a long period of time, and while sources of public funds have become diversified to the point that they now encompass multiple federal programs and agencies, strides are being made once again in tapping private sector resources. These resources include private and commercial insurance companies, business and industry, private practice groups such as health maintenance organizations, voluntary health agencies, and others.[16]

Changes in training of nutrition personnel for MCH services

Training health professionals in the special health and related nutrition needs of the MCH population has always been an important part of the philosophical base of maternal and child health services. For example, even in the post–Civil War era, Jacobi began formal courses of instruction in pediatrics, and his teaching included material on infant nutrition.[8]

From its earliest days, the federal MCH agency had a major and direct role in training the multidisciplinary professionals involved in MCH services, including nutritionists. For example, at the end of the 1918 Children's Year Campaign, the agency called a series of nine conferences across the nation to formulate minimum standards for the public protection of the health of mothers and children. Among the leaders in the relatively new fields of home economics and nutrition who took an active part in these sessions were the Institute Instructors in Dietetics for the American Red Cross and the Medical Director of the Infant Welfare Society of Chicago.[9]

When federal MCH funds became available to the states in 1921 and again in 1935, states began to use some of their grant funds to provide graduate and continuing education opportunities for professionals in a spectrum of health disciplines, including nutritionists, who were serving in MCH programs. In a 1944 report, the chief nutritionist of the federal MCH agency indicated that six states had used funds available under Title V for the further training of nutritionists. Three were enrolled at Simmons College and three at the University of Chicago. Another example of a state effort in continuing education was the joint effort of the New York State Health Department and Syracuse University in their sponsorship of the Community Nutrition Institutes for Public Health Nutritionists held over an extended period of years.[17]

Depending on program foci and the needs of the times, the federal MCH agency has continued to convene and support workshops designed to help nutrition personnel assume a leadership role in program development. For example, in 1947, a conference on nutrition in state health agencies was held. As the clinical mental retardation programs were initiated in the 1950s, a series of workshops on nutrition and diet in relation to mental retardation was convened. In the 1960s, as the M&I and C&Y Projects were developed, training programs which focused upon maternal and child nutrition were held to update practitioners. During the 1970s, program planning and budgeting received considerable attention; to help nutritionists meet the challenge of the day, numerous national and regional workshops on planning and evaluation of public health nutrition services were scheduled. The 1980s brought increasing attention to children with special health care needs, and workshops were developed across the nation to focus on nutrition in programs for children with special health care needs. During the same period, health promotion and disease prevention became a major concern. Collaborative training efforts in maternal nutrition and prevention of infant mortality and morbidity were undertaken with the March of Dimes. While short-term continuing education opportunities have been an important activity supported by Title V MCH funds, they have not been the only type of training receiving support.

From the very beginning of the Title V MCH Nutrition Program, nutrition staff in both central and regional offices worked closely with professional associations and institutions of higher learning to develop graduate training programs in public health nutrition which would provide leadership personnel to staff state maternal and child health agencies. The first graduate training program in public health nutrition to receive Title V MCH support was the program at the University of Tennessee under the leadership of Dr. Florence MacLeod. Shortly thereafter, similar programs were funded at the University of California at Berkeley, Case Western Reserve University, the University of Michigan, and the University of North Carolina.

In the 1950s, additional funds for training in public health nutrition became available under Title VII of the Public Health Service Act. Funds available under Title V of the Social Security Act and Title VII of the Public Health Service Act continue to be the major sources of support for this training. Although there have been changes in the number and location of schools offering graduate training in public health nutrition, training has been continued, with curriculum changes made as necessary to accommodate developments in the sciences as well as in the field of practice.[19]

To facilitate communication among the directors of the graduate training programs in public health nutrition, and to enhance and support their efforts, the course directors convened a meeting in Washington, DC, in 1950. The co-chairs of this first course directors conference were Adelia Beeuwkes of the University of Michigan School of Public Health and Elda Robb of Simmons College. Eventually the course directors developed their own formal organization, and they have continued to meet regularly.

As the various amendments to Title V of the Social Security Act provided for more specialized diagnostic, clinical, and comprehensive health programs (e.g., the M&I and C&Y Projects, the intensive newborn care programs, the adolescent health projects, the university affiliated programs, the pediatric pulmonary centers, and others), some of the Title V funds reserved for special projects of regional and national significance (SPRANS) have been used to develop and support the specialized training needed by the multidisciplinary staff who serve in such programs. Offered on an ongoing, regular basis, training opportunities have been developed in the area of pediatric nutrition, maternal nutrition, perinatal nutrition, and nutrition for children with special health care needs.[5]

President William Howard Taft, on April 9, 1912, put his signature to a bill passed by the Congress creating in the Federal Government a Children's Bureau charged with investigating and reporting "upon all matters pertaining to the welfare of children and child life among all classes of our people." (As stated by Bradbury, D. E., and Oettinger, K. B. [1962]. *Five decades of action for children: A history of the Children's Bureau.* Washington, DC: U.S. Department of Health, Education, and Welfare, Social Security Administration, Children's Bureau.)

Developmental Milestones in Maternal and Child Nutrition Services

Since it is impossible to encompass all the events of the years which have influenced the development of nutrition services in maternal and child health programs, only selected milestones are described in this section. It is hoped that the milestones discussed will provide a bird's-eye view of "how what is or is not" in maternal and child nutrition came to be. Some of the characteristics of the times which could have some impact on nutrition are cited in the introduction to each period.

Post-Civil War Period

Characteristics of the Period: Infant mortality was exceedingly high, although it was beginning to decrease. Child labor was common. Problems of communicable disease, poor sanitation, and lack of knowledge about child hygiene were a major challenge. The development of voluntary agencies and the organization of children's hospitals and state health agencies were beginning. Public schools assumed a greater role in the detection and control of childhood illness.

Milestones of Note:

- Children's hospitals are developed—the first in Philadelphia (1855).
- Abraham Jacobi, M.D., the father of pediatrics, begins formal courses in pediatrics and teaches infant nutrition (1860).
- State health agencies are organized—the first in Massachusetts (1869).
- The American Public Health Association is organized (1872).
- Fourteen states establish a state health agency by 1877.
- Schools initiate medical inspections of children in Boston (1894), and school lunches are introduced in New York City schools (1898).
- Visiting Nurse Associations organized in New York (1895) and Boston (1896) serve as major providers of nursing care for children in homes, public schools, and milk stations.
- Milk stations are established in 1895 (New York City) and 1897 (Rochester, NY) to provide safe milk for infants and children and to educate parents and families about child hygiene and feeding.
- Services for crippled children (CCS) are initiated in Minnesota (1897), and special schools for children who are deaf, blind, or mentally retarded are developed.

1900–1909

Characteristics of the Period: Child labor is still common. Voluntary agencies have a major role in child health, and the federal government's role is just beginning to develop. Advances in knowledge in pediatrics, obstetrics, environmental sanitation, and nutrition are under way. Education of parents and families about family health and child hygiene is expanded.

Milestones of Note:

- First Division of Child Health is created in the New York City Department of Health (1908).
- First White House Conference on Children is held and focuses on care of dependent children (1909).
- Municipal nursing services begin to develop, primarily in voluntary agencies such as Visiting Nurse Associations.
- Organized prenatal care begins in Boston (1909).
- Pasteurized milk is introduced.

1910–1919

Characteristics of the Period: World War I is declared, and a high proportion of young men are rejected for selective service for reasons of health. Food supplies as well as many other aspects of national life are affected. Maternal mortality is a significant problem. State and local health agencies become more aware of maternal and child health issues. Schools of public health are being organized, and the role of the federal government in maternal and child health is expanding.

Milestones of Note:

- The Children's Bureau is established to investigate and report upon matters pertaining to the welfare of children and child life among all classes of people (1912).
- Bulletins entitled *Prenatal Care* (1913) and *Infant Care* (1914) are issued by the Children's Bureau, and both contain information on nutrition.[20]
- The discovery of vitamins and the elucidation of their role exert a major influence on infant nutrition; e.g., McCollum and Davis (1915) discover "Fat-soluble A" and "Water-soluble B."
- Frances Stern and Lucy Gillett are pioneers in community nutrition work in Boston (about 1917).
- The first nutrition publication, *Milk: The Indispensable Food for Children*, is developed by the Children's Bureau and makes a plea for giving priority to infants and young children in allocating inadequate supplies (1918).
- United States food administrator initiates food campaign to familiarize the American people with nutrition concepts.

- The Children's Year Campaign is launched to "protect children from the effects of war." Outcomes include emphases on growth and development, development of a new Children's Bureau publication, *What Is Malnutrition?* by Lydia Roberts, and more awareness of the need for intensive studies of the economic aspects of child welfare (1919).
- Massachusetts and New York State Departments of Health employ a nutritionist.[21]

1920–1929

Characteristics of the Period: The idea that child health is a public responsibility has gained more acceptance. Most states have established a maternal and child health unit. Waves of immigration are under way. A volatile economic situation exists. Congress provides direct federal funding for personal health services, but controversy about the appropriate role of government in such services continues. Rapid progress is being made in pediatrics as well as in infant nutrition. Children of preschool age begin to receive more attention. Private organizations such as the Commonwealth Fund and the Russell Sage Foundation are active in child health. There is growing awareness of the different contributions of the various health disciplines to maternal and child health, and their different roles.

Milestones of Note:

- Nutrition studies of children in selected geographic areas of the nation are initiated by the Children's Bureau (1920).
- The National Society for Crippled Children is created, and more attention is given to care of children with handicaps (1921).
- The Sheppard-Towner Act is enacted and results in the development of full-time MCH units in the state health agencies. States give considerable attention to nutrition services and employ nutrition personnel (1921–1929).[21]
- The Children's Bureau publishes height and weight tables for children under six years of age for use by health workers.
- The Children's Bureau issues a publication, *Nutrition Work for Preschool Children*, which provides one of the first descriptions of the activities of nutrition workers on behalf of preschool children.
- The American Child Health Association, which was an outgrowth of the American Association for the Study and Prevention of Infant Mortality (1909), expands its scope of interest to include nutrition.

1930–1939

Characteristics of the Period: Severe economic depression impacts on the well-being of children. As the depression deepens, there is a decrease in available medical care for children, an increase in undernutrition, and an increase in maternal mortality. The science of nutrition expands. Social legislation is enacted to address economic security of the people and to provide funds to the states for health, education, and welfare services. Many of the infectious diseases of children are successfully controlled. The role of voluntary agencies in health care is on the wane, and some of them actually disband.

Milestones of Note:

- Nutrition is a major concern of the 1930 White House Conference, which focuses on child growth and development. *A Report on Nutrition Services in the Field* is an outcome.
- The Children's Counsel of the Welfare Federation of Cleveland employs a nutritionist to work with food administrators of camps and institutions receiving support from community funds (1934).
- Nationwide food consumption survey is initiated by the USDA (1935).
- Title V of the Social Security Act is passed and provides for three grant-in-aid programs, Maternal and Child Health, Crippled Children's Services, and Child Welfare (1935).
- Nutrition positions are established in state health agencies and progressively increase in number through the decade as a result of the availability of Title V funds.[22, 23]
- The Children's Bureau employs its first nutrition consultant, Marjorie Heseltine (1936). She provides national leadership and is a pioneer in the development of nutrition services in maternal and child health.
- The first Round Table on Nutrition and Public Health is supported by the Milbank Memorial Fund (1937).
- The Children's Bureau initiates the Nutrition Exchange to help meet a need for communication among nutritionists in the states and territories.
- Recommended qualifications for nutritionists in public health agencies are formulated by a joint committee of the American Dietetic Association (ADA), the American Home Economics Association (AHEA), and the American Public Health Association (APHA).[9]
- Emergency relief and food assistance for people in need receive high priority, and the Food Stamp Program is created (1939).
- The American Red Cross funds a five-year demonstration of nutrition services in the New York City Health Department.
- The American Academy of Pediatrics is established.

1940–1949

Characteristics of the Period: World War II results in food rationing, more women entering the work force, growth of day care programs, and development of the largest public medical care program in the country (Emergency Maternity and Infant Care Program) for the wives and infants of service men. There is rapid scientific progress in the knowledge of nutrition, medicine, and public health. Demographic changes include shifts in population from rural to urban areas and an increase in population as a result of the postwar baby boom.

Milestones of Note:

- The 4th White House Conference on Children addresses problems of nutrition and includes nutrition services among its recommendations (1940).
- The 1941 National Nutrition Conference results in the development of the Recommended Dietary Allowances.[22]
- A second nutritionist, Helen Stacey, is added to the staff of the Children's Bureau (1941), and nutritionists are added to three regional offices of the bureau (1947).

- The Public Health Service establishes mobile field units to conduct nutrition appraisals in selected areas and assigns a medical officer (1942) to work as a nutrition consultant for public health officials and the medical and dental professions.
- The Children's Bureau publishes *Food for Young Children in Group Care* to assist day care providers.
- State health departments begin to use some of the Title V special project funds to provide training for their nutrition staff.
- Graduate Training Programs in Public Health Nutrition are developed and Title V funds are made available for a nutrition training program for the first time in 1943.
- The Federal Bureau of Budget surveys nutrition programs and organization of federal agencies (1945).
- The National Academy of Sciences appoints a Committee on Maternal Nutrition and Child Feeding (1946).
- Research on nutrition and maternal health expands. Investigators include Bertha Burke (Massachusetts), Winslow Tompkins (Pennsylvania), Genevieve Stearns (Iowa), and Icie Macy Hoobler (Michigan).
- The National School Lunch Program is established (1946).
- The first dietary consultant position in a state health agency is established in Maryland (1946). As interest in this new service grows, the Children's Bureau, the Public Health Service, and the American Hospital Association (AHA) convene an institute to assist the states in developing dietary consultation services for group care settings (1948).
- The Children's Bureau sponsors the Conference on Nutrition in State Health Agencies (1947).

1950–1959

Characteristics of the Period: There are some economic advances during the decade, and fewer people live in low socioeconomic groups. Financing of health services and medical care, however, remains a significant problem for many. Migration from rural to urban areas continues. Demographic changes include an increase in the median age of the population and fewer individuals under age 20. Many communities experience little or no decline in infant mortality. Concern for the welfare of children with handicaps, including mental retardation, grows. Significant advances in medicine include the discovery of the polio vaccine and more awareness of the role of nutrition in treatment and rehabilitation.

Milestones of Note:

- Some Title V funds are earmarked for demonstration clinical programs for mentally retarded children. The Children's Bureau develops workshops on nutrition and diet in relation to mental retardation to upgrade the knowledge and skills of nutrition personnel in this area and provide a basis for the planning and development of nutrition services for the mentally retarded.
- The Course Directors of Graduate Training Programs in Public Health Nutrition organize and hold their first conference (1950).
- The Association of State and Territorial Public Health Nutrition Directors (ASTPHND) develops a formal organization (1952).
- The Indian Health Service, Public Health Service, establishes a nutrition unit to expand and improve nutrition services to Native Americans and Alaska natives.

- The Milbank Memorial Fund sponsors a conference, Nutrition in Relation to Health and Disease (1950).
- *Nutrition Practices: A Guide for Public Health Administrators* is published by APHA (1955).

1960–1969

Characteristics of the Period: Civil rights and the War on Poverty are important national issues. A massive amount of legislation is enacted which increases intervention and service programs targeted toward low-income groups. Funds for research in maternal and child health become available through Title V. A new set of child health problems begin to emerge (e.g., increases in substance abuse, adolescent pregnancy, venereal disease, and child abuse). Concern with environmental issues escalates, as does national alarm about the prevalence of hunger.

Milestones of Note:

- The Conference on the Role of State Health Departments in Nutrition Research is held under the sponsorship of ASTPHND and APHA (1961).
- Maternity and Infant Care Projects (M&I) (1963) and Children and Youth Projects (C&Y) (1965) are developed, and a significant number of nutrition personnel are employed to provide services directly to clients.[24]
- The Head Start Program is established and includes a nutrition component (1964).
- The U.S. Department of Agriculture (USDA) and the U.S. Department of Health, Education, and Welfare (DHEW) issue a joint statement, "Improving Nutrition of Needy Expectant and Lactating Women" (1964).
- Dietary consultation services in states continue to expand—e.g., New Jersey surveys feeding practices in a sample of pediatric units of hospitals (1964).
- The Child Nutrition Act is passed and expands food programs for children (1966).
- Hearings on hunger are held in Congress (1967), and the Senate Subcommittee on Nutrition and Human Needs is established. *Hunger, USA* is published, documenting the extent and complexity of hunger (1968).
- Supplementary Food Programs for Low Income Groups Vulnerable to Malnutrition are initiated by the USDA (1968) in response to a proposal developed by the federal MCH agency and submitted to the deputy assistant secretary of the USDA (1967).
- Title V funds support establishment of an intensive course in pediatric nutrition (1967) to upgrade knowledge and skills of nutrition practitioners.
- University Affiliated Programs are developed and include nutrition services and training as an important interdisciplinary component.
- Title V funds are committed for research on specific nutrition problems of mothers and children, including the Evaluative Study of the Nutritional Status of Preschool Children in the United States and the work on Maternal Nutrition and the Course of Pregnancy at the National Academy of Sciences (1968).[5]
- The White House Conference on Food, Nutrition and Health is convened (1969).

1970–1979

Characteristics of the Period: Demographic changes include a declining birth rate, an increase in the proportion of the population aged 14 to 24 years, and more working women. Federal legislation and program changes continue to impact on maternal and child health services; e.g., the Improved Pregnancy Outcome Program is initiated to improve statewide systems of care. The disparity in the availability and accessibility of health services in the states is increasingly recognized. Findings from several national nutrition studies document the prevalence of nutrition-related disorders among children. Advances in medicine include developments in genetics and medical technology, as well as increased awareness that "life-style" can have a significant impact on health. Coordination of services receives more attention, including legislative requirements for coordination.

Milestones of Note:

- Education for All Handicapped Children legislation (1970 and 1975) provides seed money and incentives to states to serve handicapped children.
- The Ten State Nutrition Survey is completed by the Public Health Service (1970).[25]
- The Office of Maternal and Child Health (OMCH) supports the Conference on Infant Feeding Practices in the United States Among Various Cultural Groups (1971).
- Workshop on Nutrition Supplementation and the Course of Pregnancy is held with Title V Support (1971).
- The Special Supplemental Food Program for Women, Infants, and Children (WIC) is established as an adjunct to health care (1972).
- Title V funds support an ongoing seminar on nutrition and pregnancy to improve nutrition services in maternal health care.
- The National Institute of Child Health and Human Development (NICHD) increases its emphasis on research on nutrition of mothers and children (1975).
- The Nutrition Education and Training Program is established (1977).
- The nutrition component of family planning services is a focus of Title X- and Title V-supported studies (1977–1978).
- *Guide for Developing Nutrition Services in Community Health Programs* is published (1978).
- The Child Care Food Program becomes a permanent program (1978) and serves child care centers, settlement houses, recreation centers, institutions for the handicapped, and other group care facilities.

1980–1989

Characteristics of the Period: Health promotion and prevention of chronic illness take the "spotlight" in public health, and national health objectives are delineated. The slowdown in the rate of decline in infant mortality is of concern in Congress, the Administration, the states, etc. Demographic changes include more first-time older mothers, large numbers of immigrants from Southeast Asia and other parts of the world, increases in the Hispanic population, and population shifts from one region of the country to another. Congress enacts legislation which modifies the role of the states and the federal agency administering MCH and other health programs. Financing of health care and cost of care escalate as national concerns. Children with special health care needs receive more attention as a result of legislation, changes in program emphasis, and approaches to care which are more family centered, community based, and comprehensive. The morbidity of childhood—e.g., injuries, mental illness, substance abuse, and pediatric AIDS—challenges public health agencies, including maternal and child health programs.

Milestones of Note:

- A workshop entitled "Training Nutrition Personnel for Public Health Programs —Needs, Issues and Directions" is convened by the Health Resources and Services Administration, U.S. Department of Health and Human Services (1984).[18]
- State Medicaid agencies are given the option of expanding coverage for pregnant women, infants, and children, including nutrition services (1986–1988).
- *Nutrition Services in Perinatal Care* is developed as a guide by the National Academy of Sciences with Title V support (1983) for use in expanding programs for care of high-risk mothers and infants.
- A series of workshops on nutrition in programs for children with special health care needs are convened across the nation to upgrade the knowledge and skills of nutritionists and other health care professionals.
- Title V funds support a new committee at the National Academy of Sciences to prepare an updated guide on nutrition in pregnancy and lactation.[26]
- *The Surgeon General's Report on Nutrition and Health* is issued.[27]
- A national effort to promote breastfeeding is launched.[28]

Summary

As noted earlier in this chapter, this brief overview of history provides only a bird's-eye view of the development of nutrition services in MCH programs. Many events and details, albeit critical in development, have been omitted from this account because of constraints such as lack of space and gaps in information. However, it is hoped that sufficient information is provided to give the reader some sense of what happened over time and to help the reader develop some appreciation of the course of events and the people involved.

In scanning this history, there are several areas of concern or issues in MCH nutrition services which appear to be ever present and challenging. Among them are the following:

- The adequacy and quality of the assessment of nutrition needs and problems as a basis for planning and action for nutrition services in MCH programs.
- The organization and financing of nutrition services.
- The need for improved coordination and collaboration among all concerned with nutrition services.
- The training of health practitioners in the science of nutrition and its application to health care.
- The transfer and application of nutrition research to improve practice.

What messages or recommendations can be gleaned from this historical overview? Only three will be mentioned.

- Graduate training programs in public health and maternal and child nutrition should review and improve the historical information which they impart to students who are preparing for leadership positions in MCH nutrition. It is important for all to know from whence we came and how we got here. Too many graduates know all the headlines of the present but have no feeling at all for what nutritionists working in MCH have endured in the past. They have no sense of history—even recent history.
- Planners, administrators, and providers of nutrition services for mothers and children should search their heads, their hearts, and their files so that it is possible to capitalize on the benefits of experience and avoid the pitfalls of the past.
- The federal MCH agency should make an effort to "capture" important historical information, including the essence of lessons learned, and preserve it for ready reference.

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Societal Trends that Affect Nutrition Status and Services for the Maternal and Child Health Populations

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This chapter identifies some of the broad social, demographic, and political trends that affect nutrition status and services for the MCH populations and that will have to be addressed if the health of mothers, children, and families is to be improved. Discussion includes demographic and socioeconomic trends, trends in health and nutrition, the impact of changing technology, and legislative and political trends.

Demographic and Socioeconomic Trends

The need for and the nature of MCH nutrition services will be dramatically influenced by the changing demographic and socioeconomic trends of the MCH population in the 1990s. This section highlights several of these trends.

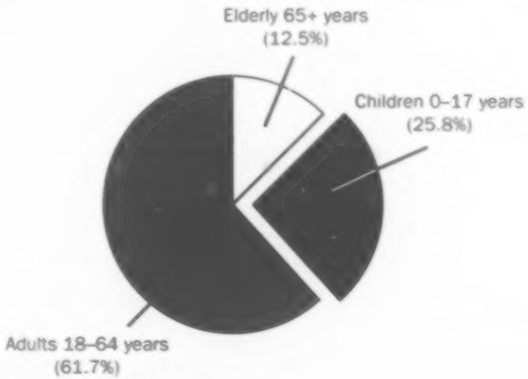
The absolute size of the maternal and child populations will remain large and expand slightly.

Currently, children (0–17) make up 25.8 percent of the U.S. population (figure 2.1), and women of childbearing age (15–44) make up 24 percent of the U.S. population.[1] These percentages are projected to remain relatively stable through the year 2000.[2] The number of children under 18 is expected to increase from 64 million in 1990 to 67 million in 2000. The number of women of childbearing age will remain stable at 57 million.[2] The growth in the child population reflects, in part, a rise in the number of new babies born during the 1980s. There was a 13.9 percent increase in the number of children under 5 years of age between 1980 and 1989.[3] The number of babies born in 1988—3.9 million—was the largest since 1964.[4] This growth is mostly a reflection of the increasing number of "baby boom" adults in their childbearing years beginning to have children; fertility rates have risen relatively little since 1975.[4] The population need for MCH nutrition services will remain strong.

The proportion of children in "dependent" populations will continue to decrease as the overall U.S. population ages.

The percentage of the U.S. population comprised of children (25.8 percent) has been declining since the 1960s when children were 36 percent of the population.[1]

Figure 2.1: U.S. population by age group: 1989

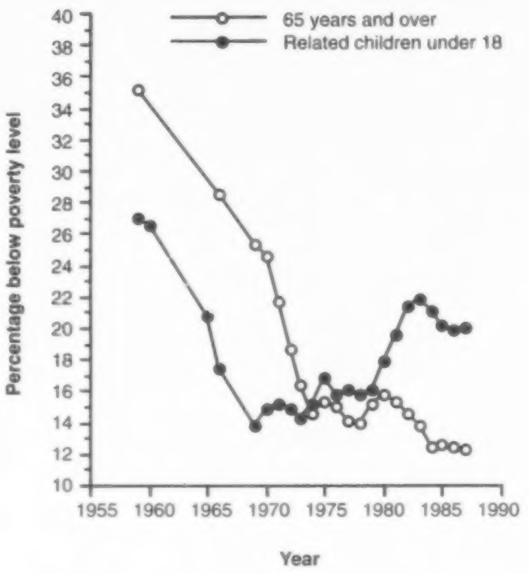


Source: Office of Maternal and Child Health, Public Health Service, U.S. Department of Health and Human Services. (1990). *Child health USA '90.* Washington, DC: U.S. Department of Health and Human Services.

The percentage of families with children, especially married couples, is also decreasing; it went from 45 percent of households in 1960 to 36 percent in 1987.[5] At the same time, the percentage of elderly individuals, especially the frail elderly, has increased from 9.3 to 12.0 percent of the population.[1] The number of children in the total population remains substantially larger, but the elderly:child ratio has shifted from approximately 1:4 to 1:2.

This "aging of the population" has and will continue to have great implications in the competition for government resources. Services for the elderly have grown dramatically since the 1960s, while services for children have increased more slowly.[6, 7] Social Security and Medicare increasingly consume larger portions of the nation's governments' social welfare budget. This dramatic impact can be seen even with Medicaid, the principal insurance program for the low-income MCH population, with adult long-term and tertiary care now consuming over 60 percent of the Medicaid budget.[8] On a positive note, the elderly have shown that poverty is a political issue; they have shown that a poorer segment of the population can achieve sufficient political will and power to legislate meaningful income redistribution programs and ameliorate much impoverishment.[7] Since 1965, poverty among the elderly has been cut in half to 12 percent (figure 2.2). Yet the most recent census figures show little change in the percentage of children in poverty since 1965.[9]

Figure 2.2: Percentage of elderly persons and children below the poverty level for selected years[a]



Source: U.S. Department of Commerce. (1988). Money, income, and poverty status in the United States: 1987. *Current Population Reports* (Series P-60, No. 161). Washington, DC: Government Printing Office.

[a] Poverty rates are not available by year for the elderly between 1960 and 1966.

The composition of the MCH population is changing. The maternal and child populations are increasingly diverse.

The black and Hispanic communities form a growing segment of the child population. Together the black and Hispanic communities constitute about 27 percent of the current child population and will make up nearly 30 percent of the child population in the year 2000.[2] In 1987, 58 percent of Hispanic households and 49 percent of black households, but only 37 percent of white households, contained a person or persons under the age of 18.[5] Black and Hispanic women continue to bear slightly more children than do white non-Hispanic women.

Immigration also contributes to the growing diversity of the U.S. MCH population. While immigration rates are difficult to forecast, there have been over 600,000 legal immigrants to the United States in recent years; the majority are children or women of childbearing years.[10] Thus the percent of children born outside the United States or of parents born outside the United

States will continue to rise. In certain urban areas, the percentage of foreign-born mothers reaches over 50 percent. These changes in MCH population composition suggest a greater need for programmatic sensitivity to the cultural and nutritional diversity, and to language barriers found among the growing MCH population.

The MCH population will remain predominantly urban.

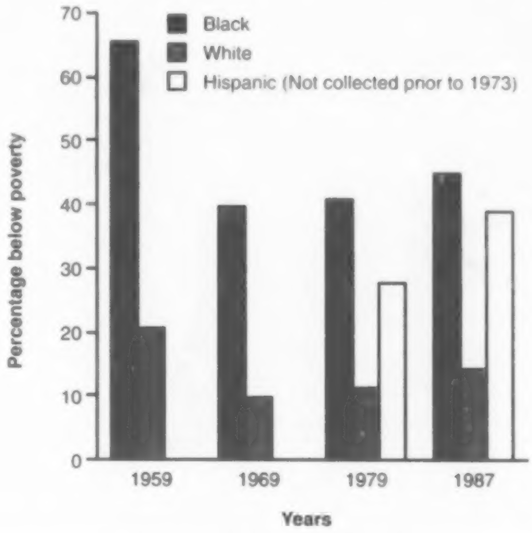
The percent of the population directly involved in farming has been declining rapidly over this century. More than three-quarters of U.S. children currently live in metropolitan areas, with 46 percent of children living directly in the central cities.[11] Only 23 percent of children live in nonmetropolitan areas. Within cities, minority children remain concentrated predominantly in the inner cities and poorer neighborhoods of major metropolitan areas. The proportion of Hispanic children living in central cities increased from 47 percent in 1976 to 54 percent in 1988; the proportion of black children in central cities stayed the same at about 56 percent; by contrast, 25 percent of white children were central city dwellers.[11] These distributions are likely to remain relatively stable through the year 2000. The predominantly urban character of MCH populations has important implications for their dependency on national policies and programs that impact on the food supply systems in the United States and on the availability of nutrition programs and education.

Rates of childhood poverty remain high in the United States and may be increasing.

Maternal and child health and nutrition problems occur disproportionately among low-income persons. Children are more likely than those in other age groups to live in poverty. In 1987, nearly 21 percent of children under 18 lived in families with incomes below the official poverty line ($11,611 for a family of four).[12] By contrast, only 12 percent of the elderly and 14 percent of persons of all ages lived in poverty.[12] The poverty rates for minority populations are even higher; black and Hispanic children are almost three times more likely to be living in poverty than are white children (figure 2.3). In 1987, poverty rates for black and Hispanic children stood at 45 and 39 percent, respectively.[12] The poverty rate for children in female-headed households (46 percent) remains more than twice that for all children.[12] The nutrition needs of impoverished children will remain critical throughout the 1990s.

The child poverty rate rose during the 1970s and 1980s from 16 to 21 percent.[12] Increases in child poverty in the 1970s and early 1980s have generally corresponded with periods of recession in the national economy. However, despite the economic

Figure 2.3: Children in poverty under 18 years of age: 1959–1987



Source: Office of Maternal and Child Health, Public Health Service, U.S. Department of Health and Human Services. (1989). *Child health USA '89*. Washington, DC: U.S. Department of Health and Human Services.

growth of recent years, child poverty rates have declined only slightly.[12] Employment opportunities in urban areas for young families without substantial education have declined dramatically.[13] Without major innovations in education, employment, and income transfer programs for families with children, the increased child poverty rates will likely continue into the 1990s.

Whatever measures of poverty level one uses, whether unemployment rates, housing (children in rental units increased from 29 to 36 percent in the 1980s), homelessness (estimated at 35,000 to 100,000 children per night), median income level ($32,000 in white families versus $17,962 in Hispanic families or $15,005 in black families),[11] or other measures, the data reveal a similar pattern of too many children living in poverty, with minority children disproportionately affected, and of the rates growing in the 1980s and showing no downward trend. These elevated child poverty rates will create a tremendous need for MCH nutrition services (including access to food, nutrition counseling, and nutrition education) and for enhanced vigilance in monitoring the MCH populations' nutrition status.

Income supports for children and families in the United States are insufficient.

Poverty is a political issue. Public programs can impact on poverty rates. As noted before, while the childhood poverty rate was increasing to 21 percent, the elderly poverty rate was declining from 30 percent in 1970 to 12 percent in 1987 (figure 2.2).[12] Income support programs are one of the key means that federal and state governments use to directly confront poverty.

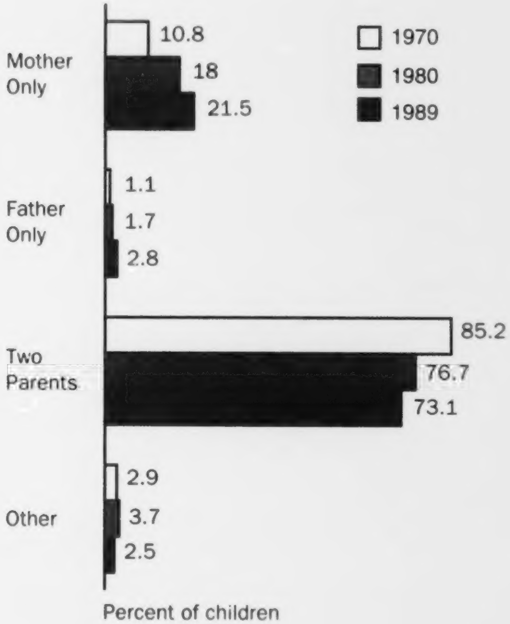
As the high rates of child poverty indicate, income support programs remain inadequate in the United States. The percentage of eligible children covered by income-related programs has been declining. In 1987, 56 percent of children in poverty received cash payments under the AFDC program, compared to 73 percent in 1975.[11] Despite recent increases in child poverty, the proportion of all children who receive AFDC has stabilized at about 11 percent during the 1980s. Average monthly AFDC payments vary widely among the states, and benefit levels have generally not kept up with inflation. In constant dollars, average monthly payments per family declined 23 percent between 1970 and 1987, from $471 to $361.[11] Food stamp and Medicaid coverage rates also declined through 1985,[11] though the Medicaid rates should improve somewhat as a result of recent amendments to the Medicaid legislation (the Consolidated Omnibus Budget Reconciliation Act [COBRA] and the Sixth Omnibus Budget Reconciliation Act [SOBRA]).

Ideally, antipoverty programs should, if adequate, raise families out of poverty until such time as they can make it on their own. In 1979, nearly one out of every five families with children that would have been in poverty without government help was lifted out of poverty by programs such as AFDC, unemployment insurance, and Social Security; by 1987, only about one out of 10 families was being rescued from poverty by government assistance.[11] A recent executive branch review of federal welfare programs suggests no new income support initiatives are likely to be forthcoming.[14] The prospects for ameliorating the impact of poverty (including its associated nutrition risks) through improvements or other changes in government income support programs would appear slim.

The family living arrangements for children are rapidly changing in the United States.

The family situations of American children were altered profoundly in the 1960s, 1970s, and 1980s. The proportion of children now living with both biological parents continues to decline dramatically (figure 2.4), with 24.3 percent living in single parent households.[4] More than 25 million children were living in something other than a traditional two-parent family in 1988; 13.5 million children were living with their mothers only; nearly 2 million were living with their fathers only; nearly 7 million were living with a natural parent and a stepparent; and another 2 million lived with neither parent (living with grandparents, other relatives or in foster homes).[11] The growth in nontraditional families has occurred in all ethnic groups, but black and Hispanic children are more likely than are nonminority children to be living in single-parent families. As of 1988, 51 percent of black children, 25 percent of Hispanic children, and 15 percent of white children were living with their mothers only.[5]

Figure 2.4: Living arrangements of children under 18 years of age: 1970–1989



Source: Office of Maternal and Child Health, Public Health Service, U.S. Department of Health and Human Services. (1990). *Child health USA '90*. Washington, DC: U.S. Department of Health and Human Services.

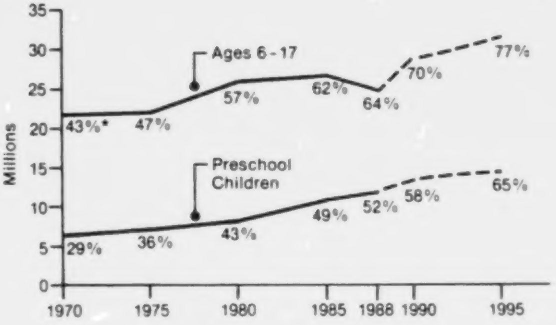
The rapid change in family arrangements from 11.9 percent single-parent households in 1970 to 24.3 percent in 1988 reflects the high rates of marital disruption and out-of-wedlock births in the United States. After doubling between 1960 and 1975, divorce rates have stabilized but remain at very high levels.[5] About half of today's marriages end in divorce, affecting more than a million children per year. In 1950, only 4 percent of all births were to unmarried mothers; by 1988, nearly one birth in four was to an unmarried mother.[5] Among blacks, more than 60 percent of births now occur outside of marriage, as do about a third of Hispanic births and an eighth of white births.[5] Unmarried mothers are usually thought to be teenagers, but two out of three births to unmarried mothers in 1986 were to women over 20 years of age.[5]

Traditional images of two-parent families eating dinner together with the food prepared by the homemaker mother are rapidly fading. This shift in family living arrangements (with changes in maternal employment) will ultimately have important nutrition implications in terms of who is responsible for feeding children, where children eat, and the kinds and quality of food eaten.

Children are increasingly raised in families where both parents or their single parent works.

There has been a tremendous growth in female (and specifically maternal) employment in the past two decades (figure 2.5). For children under six years of age, the percentage of employed mothers rose from 29 percent in 1970 to 52 percent in 1988;[15]

Figure 2.5: Children with mothers in the work force: 1970–1995



Source: Office of Maternal and Child Health, Public Health Service, U.S. Department of Health and Human Services. (1990). *Child health USA '90*. Washington, DC: U.S. Department of Health and Human Services.

for school-aged children, the percentage of employed mothers rose from 43 to 64 percent. These increasing trends are expected to continue with more women entering the paid labor force. Living with two parents, both of whom are in the labor force, is the most common family arrangement for children today, describing 42 percent of families with children. Twenty-nine percent of children are in two-parent "breadwinner-homemaker" families; 15 percent are in single-parent families where the lone parent is in the labor force; and 8 percent are in single-parent families where the lone parent is not in the labor force.[11, 16]

There are numerous nutrition implications associated with this profound shift in paid employment roles for women. Nonfamily institutions, such as schools, day care centers, and other caregivers, will become more responsible for some or all of children's meals; as a result, there is likely to be less consistent nutrition supervision. Where children eat and the types of food eaten are likely to change (e.g., more fast food restaurants and convenience foods) as working women have less time to prepare meals. And perhaps there will be less parental energy available for being responsive to nutrition advice or maintaining good nutrition supervision. On the other hand, maternal employment will increase family income, which may in turn improve the family food supply, expand health education opportunities, and increase access to health care. Research has generally shown that paid employment is neither overwhelmingly positive nor overwhelmingly negative with respect to the health status of pregnant women.[17] Its implications for child health and nutrition status are also likely to be mixed. The increasing number of women with paid employment presents new risks and new opportunities for MCH nutrition professionals.

Public institutions, especially schools, will become even more important as loci of food consumption and nutrition education for the child population.

Approximately 25 percent of U.S. children under six are in institutional day care.[15] American children are also starting school earlier and staying in school longer than they did in the past. The proportion of children who were enrolled in nursery school or kindergarten by the time they were three to four years old nearly doubled between 1970 and 1986, from less than 21 percent to 39 percent.[11] Low-income and minority children are the least likely to receive early childhood education. Twenty-seven percent of low-income families versus 42 percent of more affluent families were enrolled in preschool. At the other end of the age spectrum, the proportion of 18–19 year olds enrolled in high school or college rose from 48 percent in 1970 to 55 percent in 1986. Even at ages 20–21, a third of young people are currently enrolled in college or high school, compared with less than one fifth in 1960.[11]

Institutions are increasingly responsible for nutrition services for children. In 1989, schools provided 23.6 million children per day with lunch and 3.6 million per day with breakfast.[18] Schools also offer an opportunity to teach good nutrition habits. The summer food program provides lunches and the child care food program provides a snack and two meals to 1.3 million children a day.[18] Institutional opportunities and responsibilities for enhancing child health and nutrition status will continue to grow and be important throughout the 1990s.

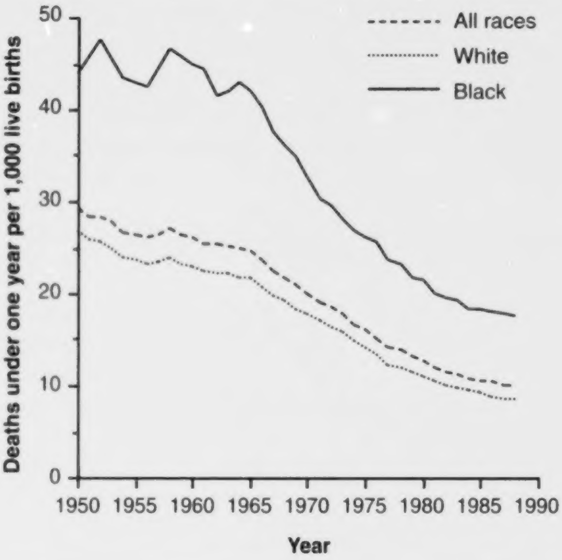
Trends in Health and Nutrition

The rate of improvement in health status of the MCH population has slowed.

The long-standing assumption that each succeeding generation in the United States will be healthier than the last can no longer be taken for granted. While the past ten to fifteen years have shown some improvements in both infant and child mortality, data on morbidity, specifically chronic illness and injuries, are less impressive.

These mixed health status trends are perhaps seen best by examining infant mortality in the United States. Although there has been a measurable decline in infant mortality rates in this decade (12.6 per 1,000 live births [1980] to 10.0 [1988]) (figure 2.6), that decline has been slowing until, in the last few years, consecutive annual rates of decline have been the slowest since the late 1960s[19] and the infant mortality rate for black infants remains almost twice as high as for white infants.[3] Other industrialized countries have improved their infant mortality rates faster than has the United States, resulting in the United States slipping to 22nd place in the world.[22] While the United States has one of the best birthweight-specific mortality rates (capacity to keep small and compromised babies alive) in the world, the underlying problem of too many low birthweight (LBW) babies remains.[19] Our LBW rate, 6.9 percent, is higher now than at any time since 1979.[20] Virtually every measurable dimension of pregnancy outcome, including the black-to-white infant mortality ratio and pregnancy rates among single women and women under 15 years, have stagnated or deteriorated in the 1980s.[21] The increasing problems of drug abuse during pregnancy and AIDS have further compromised efforts to reverse this declining pattern of maternal-infant health status. The national 1990 health objective of 9.0 infant deaths per 1,000 live births will not be attained.[22]

Figure 2.6: U.S. infant mortality rates by race: 1950–1988



Source: Office of Maternal and Child Health, Public Health Service, U.S. Department of Health and Human Services. (1990). *Child health USA '90.* Washington, DC: U.S. Department of Health and Human Services.

Children comprise the healthiest age group in the United States. The leading causes of childhood death are infant mortality, unintentional injuries, suicides and homicides, congenital anomalies, and malignant neoplasms.[24] The leading causes of hospitalization are injury, diseases of the respiratory tract, mental disorders, diseases of the digestive tract, and, for adolescent females, pregnancy.[3] While the mortality trends for children 1–14 years have improved over the last 10 years (surpassing the 1990 goal of 34 deaths per 100,000 population),[24] these trends have leveled off in the recent years. There has been virtually no improvement in the overall mortality rate due to injury among U.S. children 0–19 for the past few years.[24] As a result of excess injury mortality, overall United States child mortality remains behind European rates.[25]

The dramatic improvements in child health status in this century, from the prevention of most infectious childhood diseases (in the mid-1900s) to the improved survival of LBW infants (in the 1960s and 1970s), appear to have run their course. Congenital anomalies and sequelae, chronic illnesses, injuries, and behavioral conditions will continue to be the major causes of death and disability. None of these is likely to be easily ameliorated in the near future. Major improvements in child health status will in all likelihood not be achieved.

There is an increasing prevalence of chronic illness and disability in children.

The prevalence of chronic illness and disability among children in the United States has been increasing over time;[25] 2.1 percent of the childhood population has an identified chronic illness.[26] Improving survival of children with congenital anomalies and increasing life expectancy for children with conditions such as cystic fibrosis, diabetes, and phenylketonuria (PKU) present new challenges to the nutritionist in both the childhood and childbearing years.

In addition, the leading cause of acquired disability among children, physical injury, will continue to add to the demand for specialized nutrition care. Although some causes of unintentional injury, such as motor vehicle injuries among teenagers who can no longer obtain alcoholic beverages legally, are declining; intentional injuries, such as child abuse, assault, and attempted homicide and suicide, are rising. Unless attempts to curb the epidemic of violence against children are more successful, intentional injuries among children will more than compensate for gains currently being realized in the control of unintentional injuries. Nutrition services will have to adapt to health needs of children that are increasingly related to chronic illness and injury.

Nutrition status among some children continues to be compromised.

The overall picture of children's nutrition status is quite mixed; small improvements in nutrition status are noted at the same time that many nutrition markers are showing no improvements or even deterioration among selected childhood populations. The 1989 report of the National Nutrition Monitoring System identifies infants, adolescents, and women during the childbearing years as clearly at risk for iron deficiency anemia.[27] The Pediatric Nutrition Surveillance System, however, notes a generalized improvement in the 1980s in child iron status among low-income children who participate in public health programs, including the Special Supplemental Food Program for Women, Infants, and Children (WIC), the Title V Maternal and Child Health Programs, and the Early and Periodic Screening, Diagnosis, and Treatment (EPSDT) program.[27] This steady improvement is likely to persist if the current programs are continued. Iron deficiency among pregnant women remains a problem, however, with almost no improvement noted in the 1980s. This is not surprising since the average daily dietary intake of iron for women aged 20–45 years has remained relatively stable at 10.1 mg, which is below the Recommended Dietary Allowance of 15 mg.[28]

Adult dietary intake of sodium, total fat, and saturated fat are at higher than recommended levels.[27] It will take a concerted commitment and effort on the part of all health professionals to bring these intakes down to recommended levels. On the other hand, calcium intake continues to be low among women, who also have a higher prevalence of osteoporosis later in life. Intakes of zinc and vitamin B_6 also continue to be low, and poor biological status is reported in some populations.[27]

Low-income populations are at great risk for nutrition-related disorders.[27] In the National Health and Nutrition Examination Survey (NHANES) I and II, the growth parameters of height and weight in black and white children were lower for children below the poverty level than for children living above the poverty level. Nutrition intakes of low-income women and children in the Food Stamp Program were better than those of low-income women and children not in the program.[27] Among preschool children, persistent nutrition problems are most frequent in the low-income population. The 1968–70 Preschool Nutrition Survey and NHANES II in 1976–80 reported that children who were short for age tended to be poor, and low hemoglobin levels were highest among poor children.[29, 30] In 1983, the Massachusetts Nutrition Survey reported similar results, as did the Utah Nutrition Monitoring Project in 1985.[31, 32]

Consequences of poor nutrition status include increased illness, more infectious diseases, compromised cognitive development, increased apathy, and reduced activity levels. These effects often persist into school years.[30]

The prevalence of overweight and obesity is high in the United States and is more prevalent in women than in men.[27] There is also an ethnic variation in weight status. As reported in the Hispanic Health and Nutrition Examination Survey (HHANES) and NHANES II, Mexican-American (42 percent), Puerto Rican (40 percent), and non-Hispanic black (45 percent) women were more overweight than non-Hispanic white women (24 percent).[27] In the Continuing Survey of Food Intake of Individuals, 1985–86, 8 percent of the women reported that they were on a weight-reducing diet. In the National Health Interview Survey on Health Promotion and Disease Prevention, 56 percent of the adults classified as overweight (24 percent of the total population) reported trying to lose weight.[27]

Over the last decade, there was a steady increase in childhood obesity. Analysis of triceps skinfold in Cycles II and III of the National Health Examination Survey (NHES) (mid-1960s) and in NHANES I and II (late 1970s) demonstrates an increase of more than 50 percent in prevalence of obesity in children 6 to 11 years, and of approximately 40 percent in adolescents 12 to 17 years. (Obesity was defined as a triceps skinfold >85th percentile.)[33] The prevalence of obesity was greater in whites, but the increase in obesity was greater in African Americans; obesity was also more prevalent in winter months and in large urban areas. In a follow-up of one-third of the children examined in NHES, the increase in time spent viewing television was directly related to the prevalence of obesity.[34] Children ages 6–11 spend approximately 25 hours per week watching television. This is more time than they spend in school or any other activity except sleep. These obesity trends are particularly worrisome since there is an association between adolescent obesity and parental obesity.

Adults who were obese as adolescents constitute a majority of the heaviest adults.

There has also been a dramatic rise in the number of women and children with anorexia nervosa and bulimia in the last decade.[35] Although exact figures are hard to determine, a Gallup poll in 1985 estimated one million teenagers and one million women under 40 years were affected.

Hunger remains a problem in the MCH population.

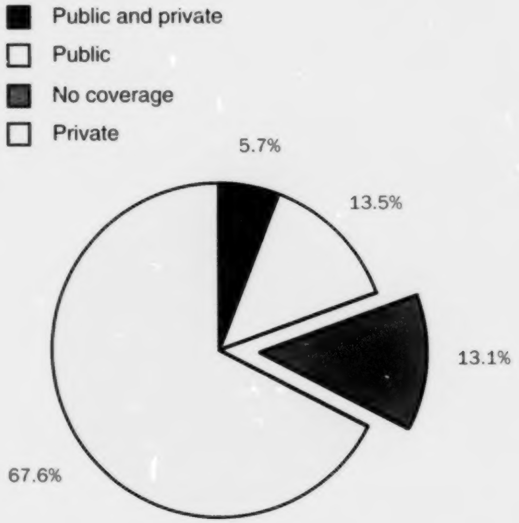
While there is debate over the exact prevalence of childhood hunger in America, there is no doubt that there has been a resurgence of hunger. Some estimate that as many as two million children go hungry every day.[36] Several regional studies document the presence and the extent of hunger in their areas. For example, a study conducted in 1988 by the Governor's Task Force on Hunger in Washington State reported that four out of five low-income families with children in the city of Seattle and in Yakima and Pend Oreille counties had experienced at least one food shortage problem in the past year due to lack of resources. Of these families, 21 to 42 percent experienced severe monthly food shortages directly affecting children.[37] One-quarter of the families sampled in a low-income neighborhood of New Haven, Connecticut, in the summer of 1986 were either experiencing chronic food shortages or at risk for shortages.[38]

In the 1960s and 1970s, a large array of aggressive nutrition, food, and financial programs led to a substantial decrease in hunger in children. The reappearance of hunger is understandable given the high poverty rates for children in America. The gap between the richest and poorest Americans is greater than at any time since the Census Bureau began collecting information in 1947, and the severity of poverty is worse.[39] Childhood hunger, like poverty, is a political issue of resource allocation and may become a chronic problem in America in the 1990s.

There is insufficient insurance coverage for the MCH population.

The medical care system is one of the principal resources for the detection, prevention, and treatment of poor nutritional health status; and use of the system is heavily influenced by health insurance coverage. Many in the MCH population have insufficient and incomplete health insurance coverage. Thirteen percent of children have no health insurance coverage (figure 2.7); 13.5 percent are covered by public health insurance, predominantly Medicaid.[3] Seventeen percent of women of childbearing years also have no insurance.[40] Recent decreases in employment-based health insurance are resulting in fewer Americans being covered, with female

Figure 2.7: Health insurance coverage of children under 18 years of age: 1988



Source: Office of Maternal and Child Health, Public Health Service, U.S. Department of Health and Human Services. (1990). *Child health USA '90*. Washington, DC: U.S. Department of Health and Human Services.

and child dependents of low-wage workers among the least well-insured groups in the United States. Over three-quarters of the uninsured are low-wage workers and their dependents.[41] Children aged 18 and under make up nearly one-third of all the uninsured in America. Even for those with conventional indemnity insurance, coverage of services for the maternal and child health population is often inadequate. Five million women aged 15–44 with private insurance have no coverage for prenatal care, and most of the remaining insured must endure waiting periods, deductibles, and copayments.[40] Most private insurance plans have systematically excluded preventive services for children.[42]

In the latter half of the 1980s, public insurance, specifically Medicaid, liberalized eligibility requirements for pregnant women and young children. Currently, state Medicaid programs are mandated to cover pregnant women and infants up to age one who are below 133 percent of the federal poverty level, and states may cover infants and pregnant women up to 185 percent of poverty. In addition, states must cover children under six who are below 133 percent of poverty and may cover six and seven year olds under 100 percent of poverty. The range of health services covered by Medicaid has also expanded; 22 states now support nutrition services as a part of comprehensive maternity care.[43] Also, as part of the Medicaid expansions, EPSDT now requires that follow-up services, including nutrition services, be provided to children with conditions detected by a health screening even if the service is not covered by the state's Medicaid plan.[43] Throughout the 1990s, these benefits are likely to be extended gradually to all children under age 18 years up to 185 percent of poverty.

One must keep in mind, however, that Medicaid is an insurance or income transference program, not a direct provider of health or nutrition services. Incremental improvements in Medicaid may not be able to keep up with the increasing need created by high levels of poverty and homelessness, and the erosion of employment-related health benefits among young families. Medicaid expansion is unlikely to fully insure all underinsured women and children. Prior to the Omnibus Budget Reconciliation Act (OBRA) of 1989, Medicaid covered only 50 percent of all poor children.[3] Medicaid eligibility levels and requirements vary by state. The enrollment process is controlled by state welfare agencies whose *modus operandi* stresses the need to prove eligibility among the "deserving" poor rather than to aggressively recruit all those who are entitled to the benefits. Most women are denied Medicaid for administrative reasons (failure to fill out the application forms correctly) rather than for eligibility reasons.[44]

The negative effect of inadequate insurance coverage continues to be seen in the most sensitive indicator of access to preventive care, immunization rates. For example, in 1985, 40 percent of children between the ages of one and four years are unimmunized for measles, a decrease in coverage since 1976.[3] The rate for reported measles increased 423 percent between 1988 and 1989.[45] The absence of universal access to health care affects children more than members of any other age group.

There is a decreasing number of accessible private health care providers.

Compounding the inadequate rates of insurance coverage is the insufficient number of private providers of health care in both rural areas and inner cities. The traditionally underserved areas have been adversely affected by the loss of National Health Service Corps professionals and by private physicians' withdrawal from obstetrics care due to increases in malpractice insurance premiums.[46] There has been a 36 percent increase in primary medical shortage areas since 1981. Even where private physicians are available, they are not necessarily accessible to the indigent and to those with Medicaid cards. Pediatricians are among the physicians most likely to see Medicaid patients, but 44 percent of obstetrician-gynecologists refuse to accept Medicaid, the highest refusal rate among primary care physicians.[47] Even for poor women who do have access to private office-based care, the outcomes are not always salutatory. Studies in North Carolina[48, 49] and Michigan[50] have documented that indigent women have better pregnancy outcomes in comprehensive public prenatal care clinics than they do in private care. Reasons for this include the fact that public sources of prenatal primary care often have multiple professionals available to deal with the complex intertwining of social and medical factors facing poorer families.

The effects of changes in access to health care on MCH nutrition services remain unclear.

The long-term impact of the recent changes in health insurance coverage and access to health care on MCH nutrition service providers is unclear. One response would be to increase access to mid-level health providers by increasing their supply and availability. The OBRA 1989 legislation, for example, should facilitate this by requiring states to reimburse nurse practitioners for pediatric care. Barriers to practice which have hampered the full participation of certified nurse midwives, nurse practitioners, and physician's assistants in the medical marketplace could yield to the pressing needs of poor and working class families for services. This, in turn, would most likely involve increased referrals to registered dietitians and public health nutritionists, since many mid-level providers are likely to seek nutrition consultation.

Similarly, pressures on health providers to "do something" about deteriorating maternal and child health status may also result in greater demand for nutrition services. One likely area of growth is in the nutrition services available for children with special health care needs (chronically ill and handicapped children). As services for these children expand and as more care for these children is relegated to the home and other settings, parents and other caregivers will need more skills to manage and care for them. In another area, the WIC program reaches nearly 100 percent of fully eligible infants in poverty in many areas of the country, but only 59 percent of the eligible pregnant women are currently served. Increasing penetration of this risk group can be expected.[51] Cost containment initiatives such as infant formula rebates and continued congressional support should make serving more pregnant women and older children possible. Recently, however, inflation has necessitated cutbacks in WIC participation in some states.

The opposite effect, a decreasing number of referrals for nutrition services, may result if utilization of preventive services continues to decline. In an era when copayments and deductibles are increasing for those who have health insurance, preventive health care often receives low priority. Access to dental care is a case in point; one-third of America's children under 15 did not see a dentist last year.[52] Medicaid reimbursements flow disproportionately into long-term and tertiary care, to the detriment of preventive care. Also, as Medicaid takes over as a source of reimbursement for health care for most poor people, traditional sources of funds for public health may decrease. The medically indigent, with neither Medicaid nor private insurance, may have nowhere to go, not even the health department. Nutrition care providers will continue to be in demand, but patients may increasingly have to qualify for a source of payment even to receive services at the local health department. Any trends which will decrease access to preventive services will also decrease access to nutrition services.

Effects of Technology on Society

The achievements of modern technology, especially in food processing and agricultural production, have produced an abundance of food and nutrition resources unsurpassed in world history. Modern food technology, however, must be viewed in light of both its positive benefits and its unintended negative consequences. Nutritionists in the 1990s will likely become deeply enmeshed in the political and scientific controversies surrounding our increasing technology-linked food supplies.

Food supply changes at the societal level may have unanticipated consequences at the household level.

In 1990, 12,000 new food products were added into the existing 20,000-item retail market.[53] Currently, the producers of these new products promote and market the nutrition/health, convenience, and taste benefits for the consumer. However, access to these new food products is not distributed equally throughout the population. Studies continue to document that low-income neighborhoods have fewer food markets with a more limited number of items.[54] The high cost of operating a business in these neighborhoods restricts the number of viable businesses and limits the variety of items on the shelves to those with assured sales, thus restricting the availability of the new food products.

Healthier foods also may not be affordable; they are often more expensive. In families, food expenses are an adjustable portion of the budget. Shelter (rent and utilities) and job expenses, such as transportation and day care, generally come first and are fixed. Food expenses take a larger proportion of the total income in low-income families than in middle- and upper-income families, even though their absolute expenditures still remain lower.[57] This becomes even more of a problem when these expenses are inadequately budgeted in the income assistance programs; for poor families, cash available for food can be seriously eroded. Currently in federal assistance programs, shelter is budgeted to be 33 percent of a family's income, but it often rises to 40 percent; food is budgeted to be 33 percent, although it is often closer to 14 percent.[55] Moreover, food stamp allotments for a family are based on the assumption that they put a portion of their monthly available cash toward food. With these financial constraints, the new healthier but costlier national food trends may have little direct impact on food consumption in poor families.

Retail food production and processing has changed markedly through innovations in technology over the past 20 years. Concentration of food production, with a marked decrease in small "family" farms, increasingly characterizes the U.S. food industry. Corporate farms and large family farms now require increasing levels of fertilizers and pesticides to maintain or increase their level of production. Water runoff that is contaminated and pesticide residues in food are consequences of these processes.[56] These contaminants may pose greater risks to children than to adults, yet many federal standards are based on the average consumption of an adult, and their impact on children who are still developing and usually consuming different quantities of these contaminants are often untested. Just as lead exposure in drinking water is a concern for child health, excessive pesticide burden for children and female farmworkers of reproductive age is likely to be an issue in the near future. Agricultural production will be increasingly viewed in an ecologically sophisticated world.

The changes in the technical capacity of food production and processing are also leading to a food supply that can be manufactured with almost any nutrient content one desires. For example, the genius of technology that invented an ingredient that performs like fat but is not absorbable is bringing Olectra,® a long-awaited food product, to the market.[57] This capacity is causing questions to be raised about the adequacy of the current mechanism for approving new foods for sale and about the rules for health claims made on food packages. These concerns become even more important given the increasing value consumers are placing on food products for health maintenance. There is every indication that the food marketplace in the 1990s will continue to be elaborate and complex, making shopping for mothers and children an intellectual as well as an economic challenge.

The nutritional impact of health education and the media may have unintended consequences.

The health promotion and disease prevention movement focuses its interventions on educating consumers to make healthier choices about diet, smoking, exercise, and other behaviors, including use of health and nutrition services. The powerful new information and mass communication technologies have great potential for reaching mass audiences with health messages sophisticatedly designed to be appealing and relevant to each target population.[58] However, when these new communication technologies are combined with an increasingly sophisticated and complex food supply industry, the results may be less beneficial than envisioned.

In theory, nutrition education efforts developed from nutritional and epidemiological studies should influence dietary choice. When health concerns are raised about foods with high fat content, heavy use of pesticides, or low nutritional value, educational efforts are adopted to reduce consumption. However, people's resources for responding psychologically and behaviorally to health messages vary tremendously according to socioeconomic circumstances. Families with high income and education are more likely to be exposed to dietary information and may have more money, time, transportation, and literacy to be able to respond to information and make sound nutrition choices.[59]

The direct effects of nutrition education efforts would seem to be largely positive, but negative and indirect effects can occur and may offset benefits.[59] Consumption changes brought about by health and nutrition education differentially impact the complex food production systems in the United States. Discontinuation of food products usually occurs slowly. Long-standing programs, such as government price supports and agricultural research, and practices such as the use of pesticides and related products, are likely to be modified only with great difficulty. When less healthy products are not purchased, industry must find other outlets for them. The discontinued products may be targeted to lower-income and less well-educated populations through increased advertising or donations. Marketing of tobacco to the poor and foreign markets following reduced consumption by higher income groups in the United States is well documented.[61]

The overconsumption of dairy products which are high in saturated fat and cholesterol was exacerbated in some cases by government distribution of excess production to poor families. Now that the supplies of processed cheese stored by the government from the dairy support program are exhausted, poor families can choose some of the low fat, low cholesterol, low sodium foods available in the markets today. However, low fat cheese and other modified products, if available in retail markets in poor neighborhoods, are often higher priced and not economically prudent for a poor family.[60] The cardiovascular consequences of a diet high in saturated fat and cholesterol are relevant in the long run to poor and black mothers who are more likely to be hypertensive and at higher risk of cardiovascular disease, as well as to children, whose adult food habits and atherosclerotic diseases begin in childhood.[62, 63]

To the extent that nutrition education is based on knowledge about what constitutes a healthy diet, the direct effects on those who can and do change their eating habits is positive. The new communication technologies may indeed offer health professionals better ways to present and target their messages, but the same technologies are available to industry and others who have different goals and more resources to use them. Industry can take advantage of newly created desires for healthy foods by targeting high-priced specialty products to higher-income consumers. There have been and will continue to be many positive changes in agricultural production (e.g., more lean meat); however, without basic changes in food production and substantial improvements in education and income, some of the MCH population may be relegated to consume the less healthy foods forsaken by the more affluent social classes.[64] Industry's sophisticated use of media far surpasses the resources of public health programs. A comprehensive public health nutrition policy for mothers and children, who are disproportionately represented among the poor, must take into account structural conditions of the food supply system and the side effects of public health interventions.

Legislative and Political Trends

MCH nutrition problems are directly impacted by social inequalities which may not be overcome in the near future.

A large proportion of maternal and child nutrition problems occur among those who lack adequate income, housing, transportation, and education. If dramatic gains were to occur in these areas, not only could nutrition problems be reduced, along with a host of other public health problems, but the need for specific ameliorative nutrition programs directed at the poor could diminish and preventive nutrition services could receive more attention.

Historical exploitation of blacks, Hispanics, and Native Americans in the United States with their resultant low levels of business and home ownership, high unemployment, poor quality jobs, low educational levels, high residential segregation, and limited political power has left these populations with a disproportionate share of nutrition problems.[65] Their higher fertility rate and larger proportion in the younger age range further exacerbate nutrition problems. The 1980s represented a decade of increasing antipathy toward the poor and minorities, especially in contrast to the gains of the 1960s. The federal government's lack of new antipoverty initiatives, mandated federal budget cuts, the decline of the urban infrastructure and organized labor, and a long-term decline in the real value of the minimum wage all contribute to this picture. In the 1980s, these trends resulted in a smaller middle class, an increased concentration of wealth, and—critically for nutrition status and services—an increased number of the poor.[66]

There is no comprehensive legislative effort to address the issue of poverty in the United States, especially excessive childhood poverty. The fundamental subsistence issues of adequate income, through income support or wages and housing, continue to be ignored or diluted. As a result, the need for food assistance grows even stronger, as the minimal cash supply of families is used first for shelter, transportation, and medical care. Rather than taking a comprehensive posture in designing and implementing responses that would alleviate the problem of poverty, multiple narrow programs are patched together, resulting in a compartmentalization of the needs of the poor and in a programmatic philosophy of managing them. Housing, job training, income support, energy assistance, food assistance, and emergency food and shelter programs reside in separate bureaucratic arms at the federal level, and even more so at the state and county levels. Prognosis for a major reduction in social inequities in America in the 1990s would appear limited, unless a new multifaceted approach to improving the economic status of the low-income population occurs.

The socioeconomic status of women and women's rights are likely to be increasingly contentious topics.

The socioeconomic status of women is critical to their health status as well as to that of their children and families. While there has been long-term improvement in the status of women in the United States, these gains have not been uniform, with periods of both retreat and rapid gain. More women have education and paid work today, and they are healthier than ever. But strong conflicting values about the role of women and families have led to sharp legislative debates in the 1980s over a host of issues—reproductive rights, comparable pay, child care, spousal violence, etc.

While more women than ever are in the paid labor force, women's wages have failed to advance relative to those of men.[67] Low wages and single parenthood are central features of the feminization of poverty.[68] Child care legislation is important to women's participation in the labor force, yet it is a contentious issue. Reproductive rights are critical to the empowerment of women and the stabilization of families. Legislative battles in the 1990s, especially around reproductive rights, will have a direct impact on health and social equity for women, and an indirect impact on much other progressive social legislation.

Programmatic access to food continues, but increases in poverty and inflation are likely to decrease the number and proportion reached.

There continue to be federal programs providing access to food, but they have not kept pace with the inflation rate and thus serve fewer women and children. In an effort to "stem this tide," the Hunger Prevention Act of 1988 restored outreach to the Food Stamp Program, assured The Emergency Food Assistance Program (TEFAP) for needy families in the face of decreasing United States surplus food supplies, and established a legislative home for the homeless and hungry who have become an issue in every state and city in the country. The Child Nutrition Programs, reauthorized in 1989, allow the Summer Food Program for Children to include certain private nonprofit organizations as sponsors, provide start-up funds for the breakfast program, increase authorization levels for the Nutrition and Education Training Program (NET), and make program improvements for the WIC, National School Lunch, and Child Care Food Programs. The reauthorization of the Farm Security Act (Farm Bill) in 1990 will provide an opportunity for revision of the Food Stamp Program, the dairy subsidy program, and the Cooperative Extension Service, among other key food and nutrition programs. While these program changes may reverse the trends of the early 1980s, the complex legislative battles which are occurring suggest limited bipartisan congressional and executive branch support for the national nutrition programs required to aggressively reach the needy MCH population. The net result may be stable food and nutrition programs throughout the 1990s, but with funding levels to serve a more limited population than is desirable.

Conclusion

The trends discussed in this chapter (demography, health and nutrition status, technology, and legislative/political) have both positive and negative implications for the nutrition status of mothers, children, and families. Nutrition services, education, and programs will, however, have to evolve and adapt to the changing characteristics of the MCH population. Extensive MCH nutrition needs will clearly remain in the future, and indeed more services may be required if the MCH population's situation continues to deteriorate. Neither technology alone nor piecemeal legislation will be able to solve long-standing nutrition needs of the MCH population as long as continuing social and racial inequities remain.

Nutritionists in MCH programs have a critical role to play in shaping the policies and practices that will determine the nutritional well-being of our citizens through the 1990s. The effective efforts of our predecessors in nutrition and health care professions have left us a rich legacy of MCH nutrition programs and practices. It is our obligation to continue to strengthen these efforts to improve the nutritional well-being of the maternal and child health population. It is hoped that this chapter will help make MCH professionals more knowledgeable about the broad social trends impacting on the nutrition status of and services for mothers, children, and families, and lead to more effective program and policy decisions and real health benefits for this population.

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Women's Nutrition for Optimal Reproductive Health

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Attention to the issue of maternal nutrition immediately brings to mind the special demands imposed by pregnancy and lactation. Completion of a satisfactory reproductive experience, however, necessitates a broader consideration of the premenopausal years. Achievement of normal growth and development during adolescence requires satisfactory nutrition support. A focus on remedying preconceptional nutrition problems likewise may reduce the risk of adverse pregnancy outcome. The postpartum months pose a nutrition challenge for the mother who chooses to breastfeed; an adequate quality and quantity of food intake is important for both maternal health and quantity of milk production. The interconceptional period provides the opportunity for a mother to reestablish nutrition reserves and/or modify body weight, when necessary, to minimize biological risks during subsequent pregnancies. A focus on maternal nutrition is therefore required during all phases of reproductive life, and health care providers in a variety of settings are responsible for nutrition interventions which will promote or maintain maternal health from childhood until menopause.

Nutrition Goals During the Reproductive Years

While most American women have access to sufficient food sources of energy, protein, and micronutrients, individual circumstances sometimes prevent a woman from achieving nutritional well-being. The problem may be one of limited resources, but it is just as likely to be one of self-selected behaviors which lead to nutrition imbalances over time. Should poor dietary practices occur during childhood and/or adolescence, growth and development can be temporarily or permanently limited. Stunted linear growth might later interfere with normal fetal development due to restricted maternal space. Chronic dieting may lead to amenorrhea and the obvious consequence of reduced fertility. Deficiencies of specific nutrients may lead to eventual depletion of nutrient stores, so that the functioning of many physiological and biochemical processes may be adversely affected; resistance to disease may decrease, and energy to perform daily activities may wane. Overeating, coupled with lack of exercise, may lead to excessive deposition of body fat; massive obesity poses a risk to the well-being of mother and child both during and after pregnancy.

The seven Dietary Guidelines for Americans provide an appropriate base for counseling women of reproductive age:

1. Eat a variety of foods.
2. Maintain healthy weight.
3. Choose a diet low in fat, saturated fat, and cholesterol.
4. Choose a diet with plenty of vegetables, fruits, and grain products.
5. Use sugars in moderation.
6. Use salt and sodium in moderation.
7. If you drink alcoholic beverages, do so in moderation.

While the food industry, educators, health care providers, and even the media are making an effort to assist consumers with dietary change, only small signs of recent dietary improvement have been recorded. For example, during the past several decades, some interesting changes have been observed in the diets of American women:[1]

- Total carbohydrate intake has gone up while fat intake has gone down; fat still contributes about 37 percent of energy, however, and fiber intake is relatively low (11.8 g/day);
- Women today are consuming a wider variety of foods than in the past, but mean daily energy intake is lower than would be expected (approximately 1,660 kcals or 75 percent of the 1989 Recommended Dietary Allowance [RDA]). This is difficult to reconcile with data on the high prevalence of overweight among American women today; the need for individualized counseling about diet and exercise options seems obvious;
- Not unexpectedly, this low level of energy intake is also associated with mean daily intake below 80 percent of the 1989 RDA for some nutrients. Included in this category are calcium, iron, magnesium, zinc, vitamin B6, and folacin;
- While a minority of women appear to use alcoholic beverages on a regular basis, the mean intake is up by more than 50 percent compared with consumption patterns of the 1970s. The impact of this trend on future reproductive experience is a concern.

Clearly there is a need for improved focus on individualized nutrition counseling for women of reproductive age. Whether defined problems are due to lack of resources, lack of nutrition knowledge, self-imposed dietary manipulations, genetic idiosyncrasies, or a combination of the above, solutions to defined problems can often be found. While the value of nutrition counseling may not be measurable immediately, the ultimate result may be improved preparation for reproduction and for the accompanying responsibilities of parenting.

Nutrition During Pregnancy

Because pregnancy is a time of growth, the need for nutrients is increased. It stands to reason that women who enter pregnancy in poor nutrition status run a risk of developing deficiencies that will have unfavorable effects on fetal development and maternal health. While maternal adaptation to some degree of nutrition inadequacy is believed to be possible, the extent to which this occurs and the mechanisms involved are poorly understood.

It is widely believed that the provision of extra food will improve pregnancy outcome in groups of high-risk, low-income pregnant women. The value of the supplemental food varies from woman to woman, but obviously the severity of the original nutrition deficit largely determines the value of added food resources. In developing countries, where food supplies are marginal much of the time, the provision of extra food is usually associated with improvement in infant birthweight. Even in developed countries, the value of nutrition intervention programs for high-risk women has been demonstrated.

Effects of intervention

A well-known example of the value of a nutrition intervention program involving nutrition counseling and extra food is the one developed by Agnes Higgins at the Montreal Diet Dispensary (MDD). The Higgins program utilizes an individualized approach to dietary treatment that combines an assessment of the risk profile for the presenting pregnancy with the application of specific nutrition rehabilitation allowances to compensate for the negative impact of diagnosed risks. Low-income women in the Montreal community have for many years taken advantage of the services offered through the MDD. Data on the program's impact have recently been published.[2] This report presents results of analyses evaluating differences in birth outcomes between 552 sibling pairs. Each mother had participated in the Higgins program during pregnancy with the second-born, but not the first-born, member of the pair. After adjustment for parity and sex, the intervention infants weighed an average of 107 g more than their matched siblings at birth (p<.01). The rate of low birthweight was 50 percent lower among the intervention infants than among their siblings (p<.01); rates of intrauterine growth retardation and perinatal mortality were also lower in the intervention group (figure 3.1). It is clear that the high risk of poor pregnancy outcome in this group of urban low-income women was reduced substantially by the Higgins program.

Other clinicians have made similar efforts to improve pregnancy outcome through nutrition intervention for underweight pregnant women and/or women demonstrating poor weight gain during pregnancy. Approximately 2,000 women seen in Virginia Health Department clinics between 1984 and 1988 participated in an experimental nutrition intervention project involving a modification of the Higgins method.[3] Those women who responded favorably to the individualized counseling program by gaining weight in accordance with recommendations showed a marked reduction in low birthweight deliveries (figure 3.2).

Similarly, Bruce and Tchabo[4] compared a group of 52 underweight pregnant women who received no counseling with a similar

Figure 3.1: Descriptive statistics of sibling pairs (Montreal Diet Dispensary)

Sibling and evaluation category	Infants (no.)	Male (%)	Parity (no.)[a]	Length of gestation (week)[a]	Birth-weight (gm)[a]	Low birth-weight (%)	Intrauterine growth retardation (%)	Perinatal mortality (rate per 1,000)
Effectiveness analyses[b]								
Intervention infants	552	52.5	3.9±2.3	39.4±1.9	3,370±528	4.9	1.4	9.1
Non-intervention infants	552	50.4	2.7±2.1	39.2±2.2	3,233±545	8.9	2.4	16.3
Efficacy analyses[c]								
Intervention infants	327	52.3	4.0±2.3	39.6±1.7	3,442±504	2.1	0.9	6.1
Non-intervention infants	327	49.5	2.7±2.1	39.2±2.2	3,221±545	8.6	3.1	9.1

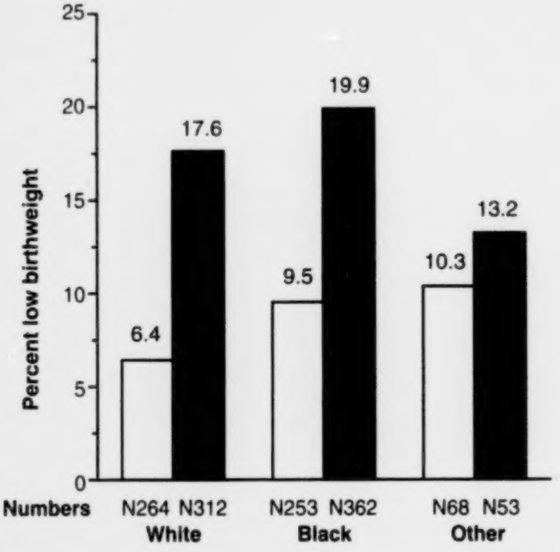
Source: Higgins, A. C., Moxley, J. E., Pencharz, P. B., Mikolainis, D., and Dubois, S. (1989). Impact of the Higgins Nutrition Intervention Program on birth weight: A within mother analysis. *Journal of the American Dietetic Association* 89, 1097–1103.

[a] Mean ± standard deviation.

[b] Effectiveness was defined for these analyses as an intervention program involving any dietitian-client contact during the pregnancy. These mothers entered the program at 21±8 weeks' gestation.

[c] Efficacy was defined for these analyses as an intervention program involving a minimum of four dietitian-client contacts during the pregnancy. These mothers entered the program at 17±6 weeks' gestation.

Figure 3.2: Low birthweight rates of underweight pregnant women enrolled in the Virginia Nutrition Intervention Project, 1984 to 1988, who were ≤90 percent of expected weight at the initial visit and either >90 percent (open bars) or ≤90 percent (solid bars) of expected weight at the last visit.



Source: Clements, D. F. (1988). The nutrition intervention project for underweight pregnant women. *Clinical Nutrition* 7, 205–210.

group of 57 underweight and failure-to-gain pregnant women who received extensive nutrition counseling and follow-up from a nutritionist throughout their pregnancies. Women in the counseled group gained significantly more weight during their pregnancies than did controls. The treated women also delivered infants who averaged 300 g heavier than those born to the control group, a difference not related to ethnic background, income status, age, or smoking. Percentage with low birthweight was 8 percent in the counseled group compared with 17 percent among controls.

Finally, Orstead and colleagues[5] evaluated the efficacy and cost-effectiveness of an individualized prenatal nutrition counseling program conducted at a major midwestern medical center. All 200 participants attended a prenatal nutrition class, but 114 of these women also received individualized nutrition counseling periodically during the course of pregnancy. The women receiving the counseling gained approximately 2.5 kg more weight but, more importantly, had fewer low birthweight infants (4 versus 13 percent). While the individualized program cost about $44,500 more than the usual program, the cost of caring for the extra low birthweight babies in the control group was approximately $230,700. The benefit-to-cost ratio was therefore about five to one.

The Special Supplemental Food Program for Women, Infants, and Children (WIC) is a federally funded food program designed to improve the nutrition and health status of low-income pregnant, breastfeeding, and postpartum women, and infants and preschool children, who are at nutrition risk. The program is administered by state health agencies. Program benefits include the provision of highly nutritious supplemental food and of nutrition education as an adjunct to health care.

In 1986, the U.S. Department of Agriculture published a five-volume report based on a very large WIC evaluation.[6] The National WIC Evaluation lasted five years and included four interrelated studies. Rush, the principal investigator, concluded that WIC had a significant effect on duration of pregnancy, birthweight, head growth, fetal mortality, and perhaps neonatal mortality. The program's effects were most clearly seen in high-risk pregnant women.

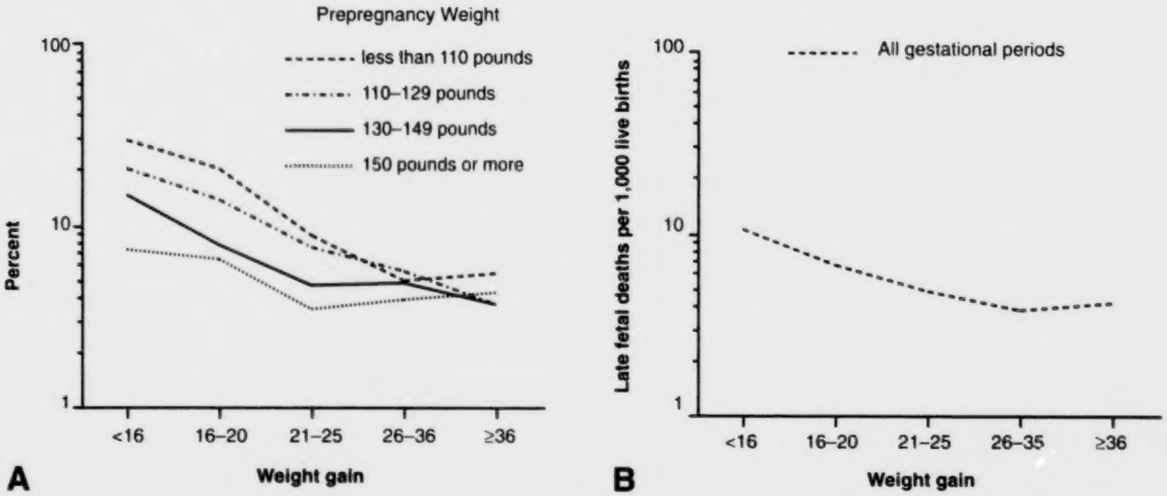
Weight gain

Weight gain is considered a satisfactory measure of adequacy of overall prenatal nutrition. Maternal weight gain normally consists of increases in both lean and fat tissue of the mother and the fetus, as well as water retention. In 1970, the National Academy of Sciences (NAS) Committee on

Maternal Nutrition recommended an optimum weight gain of 24 pounds during pregnancy;[7] data justifying this recommendation were derived from a longitudinal study of 60 pregnant women in the early 1950s. Data from the Collaborative Perinatal Project,[8] which studied over 50,000 women and their pregnancies between 1959 and 1965, suggested that the best obstetrical outcomes occurred among normal weight women who gained 20 pounds (±20 percent). Newer data from the 1980 National Natality Survey[9] and the 1980 National Fetal Mortality Survey indicate that the lowest rates of fetal mortality and low birthweight occur with a weight gain of about 26 to 35 pounds (figure 3.3).

Recently, a committee appointed by the Institute of Medicine[10] undertook a thorough review of available data related to weight gain and pregnancy outcome. Most of the literature reviewed pertained to women living in developed nations, and a majority of the reports involved white women. Thus the conclusions of this expert panel relate to women in the United States and may not apply to women living in less developed countries or to recent immigrants from developing countries to the United States. Overall, few studies were identified which provided direct evidence of the most desirable patterns of weight gain for women of different weight-for-height or of how such weight gain might be achieved through diet. The subcommittee concluded, however, that gestational weight gain has an important relationship to fetal growth and that this relationship appears to vary according to prepregnancy weight-for-height. (Recommended relative weight-for-height categories for pregnant women are defined in figure 3.4. Recommended total weight gain ranges for pregnant women are summarized in figure 3.5.)

Figure 3.3: A. Percent of liveborn infants of low birthweight by maternal weight gain during pregnancy, according to mother's prepregnancy weight: United States, 1980 National Natality Survey. B. Fetal death rates by weight gain during pregnancy: United States, 1980 National Fetal Mortality Survey.



Source: National Center for Health Statistics. (1986). *Maternal weight gain and the outcome of pregnancy, 1980* (Series 21, No. 44 DHHS). Washington, DC: Government Printing Office.

Figure 3.4: Classifying maternal prepregnancy weight-for-height status: BMI[a] compared with 1959 MLI[b] standards

Weight-for-height status	BMI	1959 MLI, %
Very Low	<16.5	<80
Low	16.5 to 19.7	80 to 90
Normal	19.8 to 26.0	91 to 120
High	>26.0 to 29.0	121 to 135
Very High	>29	>135

Source: Institute of Medicine. (1990). *Nutrition during pregnancy: Part I. Weight gain; Part II. Nutrient supplements.* Washington, DC: National Academy Press.

[a] Body mass index (BMI) = (wt/ht^2 [kg/m^2]).

[b] From Metropolitan Life Insurance Company (1959).

Figure 3.5: Recommended total weight gain ranges for pregnant women[a], by prepregnancy body mass index (BMI)[b]

	Recommended total gain	
Weight-for-Height category	kg	lb
Low (BMI<19.8)	12.5–18	28–40
Normal (BMI of 19.8 to 26.0)	11.5–16	25–35
High[c] (BMI>26.0 to 29.0)	7.0–11.5	15–25

Source: Institute of Medicine. (1990). *Nutrition during pregnancy: Part I. Weight gain; Part II. Nutrient supplements.* Washington, DC: National Academy Press.

[a] Young adolescents and black women should strive for gains at the upper end of the recommended range. Short women (< 157 cm., or 62 in.) should strive for gains at the lower end of the range.

[b] BMI is calculated using metric units.

[c] The recommended target weight gain for obese women (BMI>29.0) is at least 7.0 kg (15 lb).

Measurement. The Institute of Medicine (IOM) Committee on Nutritional Status and Weight Gain During Pregnancy (1990) recommended that health care providers adopt and implement standardized procedures for obtaining and recording anthropometric measurements to serve as a basis for classifying women according to weight-for-height, setting weight gain goals, and monitoring weight gain over the course of pregnancy.[10] Clinicians are advised to direct attention to the following procedures:

1. Accurate measurement and recording in the medical record of the woman's weight and height without shoes, using standardized procedures, during health care prior to conception.
2. Measurement of weight and height at the first prenatal visit, using rigorously standardized procedures.
3. Use of standardized procedures to measure weight at each visit.
4. Recording of weight in a table and plotting of weight on a grid in the obstetric record throughout the pregnancy. Since a tested grid has not yet been produced, the IOM committee recommended the use of provisional charts contained in its 1990 report.[10]

Counseling. The IOM committee recommended[10] that a weight gain goal be set mutually by the gravida and the professional, preferably beginning at the comprehensive initial prenatal exam. A range of desirable total gestational weight gain and rate of weight gain should be identified and accompanied by appropriate counseling. The recommended range for total weight gain and pattern of gain should be based mainly on relative prepregnancy weight-for-height and height, as summarized in figure 3.5. Adjustments are recommended for women within two years of menarche and for short women. Women carrying twins should probably have a goal in the range of 35 to 45 pounds.

The literature provides no basis for special recommendations for women of different ethnic backgrounds or for older mothers. It is likely that differences in prepregnancy weight-for-height and height account for most differences among ethnic groups. In the case of black women, shorter gestational duration may account for part of the lower mean weight gain.

Monitoring progress. By monitoring weight gain throughout the pregnancy, abnormal patterns of gain may be identified and appropriate interventions chosen. Reasons for marked or persistent deviations from the expected pattern of gain should be investigated. When abnormal gain does not appear to be a result of measurement error, the care provider and patient should jointly develop and implement appropriate actions.[10]

Energy requirements

Two factors that determine energy requirements during pregnancy are changes in the mother's usual physical activity and the increase in her basal metabolism to support the work required for growth of the fetus and accessory tissues. The cumulative cost of this extra "work" has been estimated at about 80,000 kcals, which translates into about 300 extra kcals per day.[11]

Actual energy intakes of pregnant women are often less than proposed needs. This led Durnin and colleagues to initiate the now famous five-country study,[12] a centrally organized project aimed at evaluating energy requirements for pregnancy. This integrated endeavor took place in two developed countries (Scotland and the Netherlands) and three developing countries (the Gambia, Thailand, and the Philippines). Methods of investigation were standardized in the five centers, and in all cases women were recruited for participation early in pregnancy or in the preconception period. Throughout each pregnancy, effort was made to evaluate body weight and body fat, energy intake, basal metabolic rate, and daily energy expenditure.

The characteristics of the study populations are defined in figure 3.6. It is clear that the populations are very diverse, but the differences are much smaller when variables are expressed as a proportion of the initial body mass. Adjusting for differences in maternal size and excluding the unique women from the Gambia, the estimated energy cost of pregnancy was approximately 60,000 kcals, somewhat less than previous estimates by Hytten and colleagues.[11] The 1989 Recommended Dietary Allowances reflect this revised estimate since an extra 300 kcals daily is advised during the second and third trimesters (figure 3.7).[13]

It is widely appreciated that restricting calories during the course of pregnancy is often associated with reduced infant birthweight, particularly among women who followed weight-loss regimens during the second and third trimesters. In one study of dieting, the percent of newborns weighing less than the 25th percentile at birth rose from 3 percent to 35 percent in the dieting population.[14] In another case, significant energy and carbohydrate restriction was associated with a drop in mean birthweight of more than 400 grams.[15]

Protein requirements

Protein requirements during pregnancy are based on the needs of the nonpregnant reference woman plus the extra amounts needed for growth. The easiest way to determine how much extra protein is needed daily to support the synthesis of new tis-

Figure 3.6: Initial characteristics of the subjects in the five-country study (mean)

	Scotland	The Netherlands	The Gambia	Thailand	Philippines
n	88	57	52	44	51
Age (year)	27.7	28.6	25.9	23.0	23.4
Parity	1.0	1.1	3.8	1.7	2.6
Height (m)	1.62	1.69	1.58	1.52	1.51
Weight (kg)[a]	57.3	62.5	51.4	47.6	44.4
Sum of 4 skinfolds (mm)	49.3	55.3	31.3	41.1	46.5
Fat mass (kg)[a]	15.1	17.7	10.3	11.3	11.2
Fat mass as % body weight	26	28	20	24	25
Fat-free mass (kg)[a]	41.9	44.7	41.0	36.4	33.2
Fat-free mass as % body weight	73	72	80	76	75
Energy intake (kcal/day)[a]	2,127	2,127	—	1,912	1,745
BMR (kcal/day)	1,338	1,530	1,315	1,267	1,195
BMR (kcal/kg weight/day)	23	25	26	27	27
BMR (kcal/kg fat-free mass/day)	32	34	32	35	36
Birthweight (g)	3,370	3,458	2,980	2,980	2,885
Placental weight (g)	641	657	500	530	526
Mean total weight gain (kg)	11.7	10.5	7.3	8.9	8.5
Weight gain as % of initial weight	20	17	14	19	19
Mean fat gain (kg)	2.3	2.0	0.6	1.4	1.3
Fat gain as % of initial weight	4.0	3.2	1.2	2.9	2.9

Source: Durnin, J. V. (1987). Energy requirements of pregnancy: An integration of the longitudinal data from the five-country study. *Lancet* 2, 1131–1133.

[a] Measured at or near 10 weeks' gestation. Fat mass and fat-free mass estimated from sum of four skinfolds and body weight.

sue is to divide the amounts contained in the products of conception by the average length of gestation. About 925 g of protein are deposited in a normal-weight fetus and in the maternal accessory tissues. When this is divided by the 280 days of pregnancy, the average is 3.3 g of protein that must be added to normal daily requirements. The rate at which new tissue is synthesized, however, is not constant throughout gestation. Maternal and fetal growth do not accelerate until the second month, and the rate progressively increases until just before term. The need for protein follows this growth rate. Only about an extra 0.6 g of protein is used each day for synthesis in the first month of pregnancy, but by 30 weeks' gestation, protein is being used at the rate of 6.1 g/day. Assuming that the efficiency of protein utilization during pregnancy is about 70 percent, the additional dietary need for protein would be about 10 to 12 g per day during the latter half of pregnancy. Thus the 1989 RDA for protein for pregnant women is 10 g per day above that recommended for nonpregnant women.[13]

Adverse consequences of protein deficiency during pregnancy are difficult to separate from the effects of energy deficiency in real-life situations. Almost all

Figure 3.7: Recommended Dietary Allowances for women of reproductive age (1989)

Nutrient	Age				
	11–14	15–18	19–24	25–50	Pregnancy
Energy (Kcals)	2,200	2,200	2,200	2,200	+300[a]
Protein (gm)	46	48	46	50	60
Vitamin A (RE)	800	800	800	800	800
Vitamin D (µg)	10	10	10	5	10
Vitamin E (mg)	8	8	8	8	10
Vitamin C (mg)	50	60	60	60	70
Folic acid (µg)	150	180	180	180	400
Niacin (mg)	15	15	15	15	17
Riboflavin (mg)	1.3	1.3	1.3	1.3	1.6
Thiamin (mg)	1.1	1.1	1.1	1.1	1.5
Vitamin B_6 (mg)	1.4	1.5	1.6	1.6	2.2
Vitamin B_{12} (µg)	2.0	2.0	2.0	2.0	2.2
Calcium (mg)	1,200	1,200	1,200	800	1,200
Phosphorus (mg)	1,200	1,200	1,200	800	1,200
Iodine (µg)	150	150	150	150	175
Iron (mg)	15	15	15	15	30
Magnesium (mg)	280	300	280	280	320
Zinc (mg)	12	12	12	12	15

Source: Food and Nutrition Board, National Research Council, National Academy of Sciences. (1989). *Recommended Dietary Allowances*, 10th ed. Washington, DC: National Academy Press.

[a] Second and third trimesters.

cases of limited protein intake are accompanied by limitation in the availability of energy. Under such circumstances, decreased birthweight has been reported. The true role that protein deficiency plays in this undesirable situation is unclear.

Adverse effects of excessive protein intake during pregnancy are poorly understood. A supplementation study conducted in New York in the 1970s suggested, however, that use of a high-protein supplement by low-income pregnant women was associated with an increased number of very prematurely born infants and with excessive neonatal deaths.[16] Subsequent evaluation of supplementation studies in human populations suggested that providing a supplement with more than 20 percent of the energy from protein is associated with retarded fetal growth, whereas supplements providing less than 20 percent of energy from protein generally yield increments in birthweight of offspring.[17] Although these data suggest that too much protein (presented in an unbalanced nutrition package) may have negative effects on pregnancy course and outcome, data are limited and continued evaluation of this question is justified.

Vitamin and mineral considerations

Vitamins. The physiological and metabolic demands of pregnancy quite logically increase vitamin requirements. A liberal estimate of these increased needs is provided in the most recent edition of *Recommended Dietary Allowances* (figure 3.7). The American diet offers ample opportunity to fulfill these estimated needs. Limited food intake or poor dietary choices over time, however, may compromise vitamin status. The IOM Subcommittee on Dietary Intake and Nutrient Supplements During Pregnancy (1990) recommended that a daily multivitamin-mineral preparation be taken by pregnant women who do not ordinarily consume an adequate diet, and those in high-risk categories, such as women carrying more than one fetus, heavy cigarette smokers, and alcohol and drug abusers. The multivitamin-mineral preparation should be taken beginning in the second trimester and should contain the following nutrients:

Iron	30 mg	Vitamin B_6	2 mg
Zinc	15 mg	Folate	300 µg
Copper	2 mg	Vitamin C	50 mg
Calcium	250 mg	Vitamin D	5 µg

Complete vegetarians (those who consume no animal products at all) should supplement their diet daily with 10 µg (400 IU) of vitamin D and 2.0 µg vitamin B_{12}.[10]

Iron. The amount of elemental iron that the nonpregnant, nonlactating woman must transport from the gut to the circulation is only about 1.5 mg/day; 1.0 mg to replace daily losses plus 0.5 to 0.8 mg/day to compensate for menstrual losses. During normal pregnancy (figure 3.8), the iron requirement is 1.0, 2.0, and 4.0 mg/day to meet the needs, respectively, during the first, second, and third trimesters.[18] Since the efficiency of absorption is poor (10–30 percent of dietary intake), the level of ingested iron must exceed by a substantial level these daily needs. A well-balanced American diet generally provides about 6.0 to 7.0 mg of iron per 1,000 kcals or 12 to 14 mg of iron per day for women.

Figure 3.8: Iron "cost" of a normal pregnancy

Iron contributed to the fetus	200–370 mg
Iron in placenta and cord	30–170 mg
Iron in blood lost at delivery	90–310 mg
TOTAL	310–850 mg[a]

Source: Bothwell, T. H., Charlton, R. W., Cook, J. D., and Finch, C. A. (1979). *Iron metabolism in man*. Oxford: Blackwell Pub. Co.

[a] These figures are in addition to the normal excretory loss of 0.5 to 1.0 mg/day and ignore the demand during the second half of pregnancy for iron to support the expansion of red blood cell mass. This latter amount (200 to 600 mg) is not included as an iron "cost" because it is largely conserved (and not lost from the body) when the red blood cell mass returns to normal after delivery.

If the diet of the pregnant woman does not satisfy her iron needs, it is then necessary to draw upon available iron reserves to prevent the development of anemia. Under some circumstances, iron stores may be abundant and more than cover the extra iron demands of pregnancy. However, available data on the iron status of American women (as well as women in many other parts of the developing and developed world) suggest that at the very least, one woman in ten maintains low iron reserves. Some women entering pregnancy would therefore be at high risk for the development of iron deficiency anemia unless food choices are markedly altered or iron supplementation is implemented.

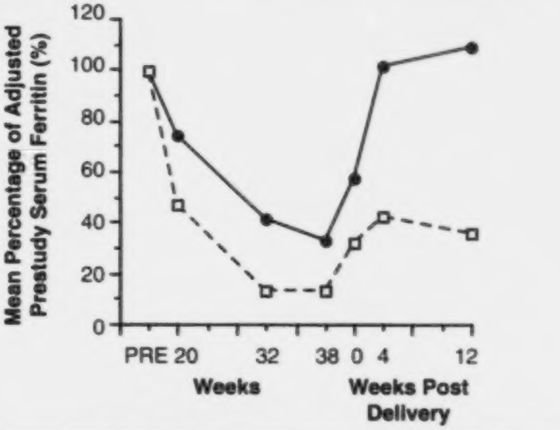
Serum ferritin is generally regarded as a useful index of the status of iron stores. Several investigators have evaluated the changes in serum ferritin concentrations during pregnancy and compared these changes with other usual measures of iron status. Dawson and McGanity, for example, selected 42 healthy young women less than 16 weeks pregnant, with normal hematologic status.[19] Each woman was randomly assigned to a multivitamin/multimineral with 65 mg iron or one without iron. Those receiving the multivitamin without iron had significantly lower mean serum ferritin levels (figure 3.9). During the study, 9 (43 percent) of the 21 subjects not receiving iron failed to maintain an acceptable hemoglobin level (≥11 g/dl) and were medicated with 110 mg ferrous iron daily. The researchers concluded that maternal iron stores cannot be maintained during pregnancy without the use of a low-level iron supplement.

If depletion of iron reserves occurs during pregnancy and iron supplements are not utilized, repletion of iron stores may require a considerable period of time. Taylor et al. measured serum ferritin levels in a population of 154 women of reproductive age.[20] Serum ferritin concentrations ranged from 4.7 to 169 µg/l. Recent childbirth was associated with low serum ferritin values. Among those women not using iron supplements, it appeared to take up to two years after pregnancy before prepregnancy serum ferritin values were regained (figure 3.10).

It is unfortunate that measurement of serum ferritin concentration is not a simple and inexpensive office procedure. Because this is the case, efforts are being made to find another laboratory test which adequately estimates iron stores but can be handled routinely by office nursing personnel. A promising candidate is the zinc protoporphyrin/heme ratio.[21]

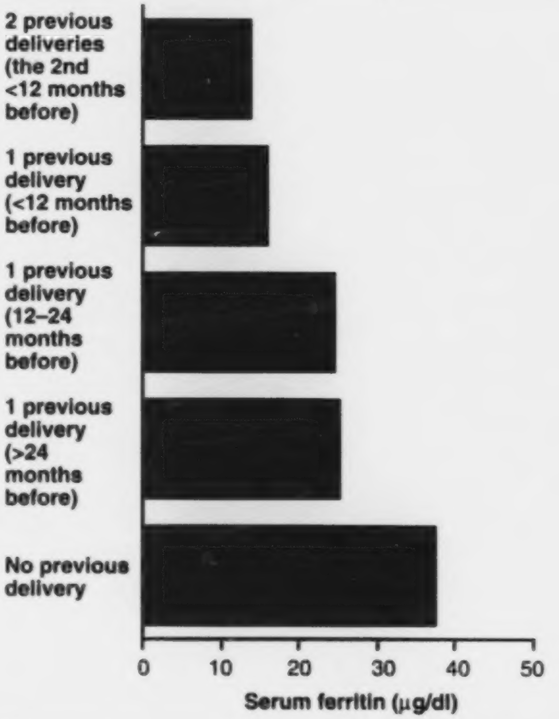
In the meantime, the IOM Subcommittee on Dietary Intake and Nutrient Supplements During Pregnancy (1990) recommends that pregnant women receive an oral iron supplement of 30 mg of ferrous iron daily during the second and third trimesters.[13] Most prenatal vitamin/mineral supplements supply this recommended level of iron in the form of ferrous salts. While it is widely accepted that supplemental iron will help to maintain maternal iron stores, other benefits (if any) to the course of pregnancy are unclear.

Figure 3.9: Group mean serum ferritin changes from prestudy baseline of adjusted control and supplement groups. ●=supplement (n=21); ■=control (n=21).



Source: Dawson, E. B., and McGanity, W. J. (1987). Protection of maternal iron stores in pregnancy. *Journal of Reproductive Medicine* 32, 478–487.

Figure 3.10: Effect of childbearing and period since last delivery on serum ferritin concentration



Source: Taylor, D. J., Mallen, C., McDougal, N., and Lind, T. (1982). Serum ferritin in women of reproductive age. *British Journal of Obstetrics and Gynaecology* 89, 1000–1005.

Figure 3.11: Definition of anemia

Trimester	Hemoglobin (gm/dl)
First	<11.0
Second	<10.5
Third	<11.0

Source: National Academy of Sciences. (1990). *Nutrition during pregnancy: Weight gain and nutrient supplements.* Washington, DC: National Academy Press.

For women who are anemic by the standards presented in figure 3.11, supplemental iron should be given in therapeutic doses of a total of 60 to 120 mg/day, in divided doses. The effectiveness of this therapy should be monitored at subsequent prenatal visits. If anemia persists after treatment, inquiries should be made about compliance and there should be further laboratory evaluation. If anemia is reversed, administration of iron at the lower dose of 30 mg daily can be resumed.

Excessive iron supplementation should be avoided for several reasons. First, supplemental iron is known to be associated with gastrointestinal discomfort in a number of individuals. Second, iron is known to inhibit zinc absorption if consumed at a ratio higher than 2:1.[22, 23] The IOM Subcommittee on Dietary Intake and Nutrient Supplements During Pregnancy (1990) suggests that when therapeutic levels ($\geq$30 mg/day) of iron are given, supplementation with 15 mg of zinc and 2 mg of copper is desirable.[10]

Calcium. The fetus acquires most of its calcium in the last trimester when skeletal growth is maximum and teeth are being formed. Widdowson has calculated that the fetus draws 13 mg/hour of calcium from the maternal blood supply, or 250 to 300 mg/day.[24] At birth, the infant has accumulated approximately 25 g.

The current RDA for calcium during pregnancy is 1,200 mg, a level 400 mg higher than that recommended for the mature nonpregnant woman.[13] Some argue that this allowance is set too high since apparently successful pregnancies occur in many other cultures with calcium intakes substantially below those recommended. The explanation is likely to relate to the large calcium reservoir in the maternal skeleton, of which the total requirement for pregnancy (30 g) amounts to about 2.5 percent. It should also be noted that in many other cultures, diets are consumed that contain less phosphorus and protein; this factor might serve to reduce the degree of calcium loss in the urine.

While extensive adjustments in calcium metabolism are routinely observed in the pregnant woman, the impact of these changes on bone density and morphology is largely unknown. Likewise, the relationship of maternal dietary calcium to maternal and fetal bone characteristics remains to be confirmed. At this point, however, it is purely speculative to propose that osteoporosis in later life is associated with reproduction in the face of suboptimal dietary calcium.

While available data are insufficient to support routine calcium supplementation during pregnancy for the prevention of osteoporosis, prenatal nutrition counseling should certainly address dietary strategies to meet calcium needs. Dairy products obviously represent a major source of dietary calcium, but a variety of other non-dairy sources can make significant contributions. In situations where milk intolerance severely limits intake of dairy products, recommendation of a calcium supplement should be considered. This is particularly important for women who are under 25 years of age and whose dietary calcium intake is less than 600 mg per day. In such cases, a supplement of about 600 mg daily is suggested.[10]

Zinc. While data from animal models convincingly show that maternal zinc deficiency is associated with abnormal fetal development and prolonged labor, epidemiologic and clinical reports of such effects in pregnant women are less convincing. Yet, such reports do exist.[25–27] Recently, zinc status was evaluated in 279 pregnant women at delivery and was subsequently compared with the incidence of complications during the antenatal period and of major dysfunctional labor patterns (figure 3.12). Low levels of plasma zinc were associated with more complications in the prenatal and intrapartum periods. The authors suggest that suboptimum zinc nutrition or abnormal zinc absorption/metabolism may directly affect pregnancy course and outcome.[28]

Several efforts have been made to examine the impact of zinc supplementation on the course and outcome of human pregnancy. Low-income Mexican-American women supplemented with 20 mg of zinc daily had a lower incidence of pregnancy-induced hypertension than did unsupplemented women; no difference in other complications was associated with zinc supplementation.[29] Seven Scandinavian women with low serum zinc concentrations were supplemented with zinc (90 mg daily) during the latter 6 to 16 weeks of pregnancy.[30] At delivery, these women had shorter labors and less blood loss than 13 similar unsupplemented women, 6 of whom experienced "severe hemorrhage with uterine atony." In a further study, half of the women with serum zinc concentrations less than the mean 65 μg/dl at week 14 of pregnancy were given 45 mg of zinc daily. Of 69 unsupplemented women, 33 had normal deliveries, compared to 40 of 64 supplemented women. Normal pregnancy outcomes resulted from only 26 percent of the pregnancies in which serum zinc at week 14 was less than the mean and declined thereafter.[30] Even though these observations are interesting and suggest that continued attention to the role of zinc in the reproductive process is justified, routine prescription of zinc supplements for pregnant women has not been proposed by any recognized professional committee or government agency.

Figure 3.12. Relationship between plasma zinc and antenatal and intrapartum complications.

	Plasma zinc		
	Low (n=144) (%)	High (n=135) (%)	p value
Mild toxemia	5.6	0.7	0.02
Vaginitis	12.6	4.4	0.01
Postterm >42 wk	4.2	0	0.01
Prolonged latent phase	2.8	0	0.05
Protracted active phase	28.7	8.2	0.04
Labor >20 hr	6.3	1.5	0.03
Second stage >2.5 hr	6.3	0.7	0.01
Lacerations >3rd degree	7.0	1.5	0.02

Source: Lazabnik, N., Kuhnert, B.R., Kuhnert, P.M., and Thompson, K.L. (1988). Zinc status, pregnancy complications and labor abnormalities. *American Journal of Obstetrics and Gynecology* 158, 161–166.

Dietary "non-nutrients"

The impact of alcohol on fetal development has been mentioned previously, but the mechanisms by which this substance produces its widespread effects are not completely understood. Since alcohol can cross the placenta, the current hypothesis is that high alcohol levels build up in the fetus and produce direct toxic effects. Another theory is that some of the effects assumed to be caused by alcohol may be due to maternal malnutrition, but evidence for this idea is not strong.

How much alcohol can be safely consumed during pregnancy? The answer to that question is not available. It is apparent, however, in reviewing data from numerous studies that very moderate drinking is not directly associated with any *measurable* adverse outcome of pregnancy.

For example, Halmesmaki et al. reported that fewer than two drinks weekly had no detectable adverse effects on fetal outcome.[31] This observation is especially important in light of the panic which occasionally strikes when a woman learns that she is pregnant after a brief exposure to alcohol, often in small amounts. Such a woman should be reassured that the chances are very good that no damage to her fetus has occurred.

Coffee and/or caffeine consumption has been associated with a reduction in birthweight and with an increased risk of low birthweight infants, particularly among term deliveries.[32-38] It is not clear in some of these studies, however, whether the effects were due to caffeine, to some other constituent of coffee, or to other characteristics of coffee drinkers. In contrast, other studies have found no association between maternal caffeine or coffee consumption and reduced birthweight[39, 40] or preterm delivery.[39] Given the inconsistency of the available evidence, recommending abstinence from caffeine-containing foods seems unjustified, although moderation may be advised.

Preconceptional Nutrition Concerns

A new thrust in prenatal care is to begin the process with attention to preconceptional issues of concern.[41] This concept makes a great deal of sense since efforts at intervention after the first prenatal visit may occur too late for the pregnancy course and outcome to be significantly affected. It is hoped that eventually preconceptional care will be shown to yield such positive results that insurance coverage will routinely be provided and clinicians will urge their clients of reproductive age to prepare for conception in every way possible. This preparation should include a formal preconceptional evaluation to determine (1) if reproduction is associated with high risk that is not modifiable, thus suggesting that serious consideration should be given to avoiding pregnancy; and (2) if modifiable risks exist that, if identified and addressed, could significantly improve the likelihood of a good pregnancy outcome.

Underweight

Numerous studies have clearly shown that underweight (generally defined as wt/ht ≤90 percent of ideal) women are at increased risk for reproductive problems.[42] Not only is fertility compromised, but the likelihood of premature delivery and intrauterine growth retardation is increased. It is thus no surprise that Apgar scores of offspring are more frequently low (figure 3.13). The condition of underweight is potentially modifiable since it is often related to abusive dieting practices and/or exercise programs. A woman motivated toward improvement of her body weight-for-height status may successfully and healthfully achieve her goal within a relatively short period of time (three to six months).

Figure 3.13: Infant morbidity in underweight women and normal-weight controls

Infant morbidity	Low prepregnancy weight (% of births)	Normal weight controls (% of births)
Low birthweight	15.3	7.6
Prematurity	23.0	14.0
Low Apgar score	19.0	12.0

Source: Edwards, L. E., Alton, I. R., Barrada, I. M., and Hakanson, E. Y. (1979). Pregnancy in the underweight woman: Course, outcome and growth patterns of the infant. *American Journal of Obstetrics and Gynecology* 135, 297–302.

Obesity

Women exceeding their desirable body weight by more than 35 percent are at greater risk than normal-weight women for unsatisfactory pregnancy course and/or outcome. Numerous studies have shown that obese women are at higher risk for antenatal complications, especially pregnancy-induced hypertension, gestational diabetes, urinary tract infections, and pyelonephritis. They also are more likely to demonstrate prolonged labor followed by difficult vaginal delivery, and thus are more frequently delivered by caesarean section.[43] Perinatal mortality is likewise higher for obese women. In one study, perinatal mortality in offspring of morbidly obese women was 22.5 percent and in offspring of moderately obese women was 16.6 percent, compared to 11.5 percent and 6.7 percent for offspring of underweight and normal weight women, respectively.[44] Surviving babies of obese mothers may present more challenges in management during the neonatal period, since they often demonstrate difficulty in regulating blood glucose.[45] Reducing the degree of maternal obesity prior to conception theoretically should improve pregnancy progress and outcome. Attempts along this line are worth making if time permits and if the woman appears to be properly motivated. Unfortunately, such motivation may not exist, or if it does, ability to follow a prescribed program may be limited. In any case, attempts should be made throughout the reproductive period (if not before) to prevent the development of excessive adiposity. It is hoped that within the next several decades our understanding of obesity will have increased so substantially that workable prevention and treatment strategies will be applied routinely early in life or as necessary prior to conception.

Micronutrient imbalances

If deficiencies or excesses of either vitamins or minerals are associated with congenital malformations and/or spontaneous abortion, then correction of such imbalances is most likely to improve outcome if it is accomplished prior to (or at least by) the time of conception. Unfortunately, our understanding of the role of nutrient deficits and excesses in the etiology of early pregnancy problems is very poor. Several issues are worthy of discussion, however.

Folic acid deficiency. The consequences of folic acid deficiency in the absence of anemia are controversial. Maternal folic acid deficiency in experimental animals is associated with increased incidence of problems related to pregnancy, including congenital malformations in the offspring.[46] Malformations in offspring of women using drugs that are folate antagonists have been described.[46] Limited evidence also suggests that deficiency of this vitamin in humans may be associated with spontaneous abortion and congenital malformations, but these relationships are poorly documented and therefore highly controversial.

The role of folic acid deficiency (or deficiency of some other vitamin) in the etiology of neural tube defects is presently a subject of considerable research focus. Smithells et al.,[47-49] Sheppard et al.,[50] and Laurence et al.[51] in northern Europe have suggested that periconceptional multivitamin or folic acid supplementation of women with previous neural tube defect offspring is associated with significant reduction in reoccurrence of the problem. In the Smithells et al. studies, women who had previously given birth to an infant with a neural tube defect were provided with an iron and multivitamin supplement (with folic acid) and directed to take it three times daily, for not less than 28 days prior to conception, until the second missed menstrual period. The control group did not follow this protocol (these women either declined to participate in the study or were already pregnant). Significantly more infants with neural tube defects were produced by the controls.

Research in the United States has yielded conflicting results. Mulinare et al. completed a retrospective project using data from the Atlanta Birth Defects Case-Control Study.[52] Periconceptional multivitamin use was assessed in mothers of babies with neural tube defects and in mothers of control infants; an apparent protective effect of periconceptional multivitamin use was reported. Similarly, Milunsky et al. examined the relationship between multivitamin intake in general (and folic acid in particular) and the risk of neural tube defects in a cohort of 23,491 women undergoing maternal serum alpha-fetoprotein screening or amniocentesis around 16 weeks' gestation.[53] The prevalence of neural tube defects was 3.5 per 1,000 among women who did not use multivitamins before or after conception or who used multivitamins before conception only. The prevalence of neural tube defects for women who used folic acid-containing multivitamins during the first six weeks of pregnancy was substantially lower, 0.9 per 1,000. For women who used multivitamins without folic acid during the first six weeks of pregnancy, and for women who used multivitamins containing folic acid beginning after seven or more weeks of pregnancy, the prevalences were similar to that of the nonusers, and the prevalence ratios were close to 1.0. Mills et al., however, conducted a similar study involving women from Illinois and California.[54] In this study, periconceptional use of multivitamins or folate-containing supplements was not associated with a decreased risk of having an infant with a neural tube defect. A randomized controlled supplementation trial currently under way in northern Europe may clarify the role of vitamin deficiency in the etiology of neural tube defects.[55] In the meantime, preconceptional nutrition counseling should include information about sources of vitamin-rich foods. At least one expert panel has recommended that a woman who has had a pregnancy resulting in a neural tube defect should be advised that folic acid supplementation *may* be protective.[41]

Vitamin A teratogenesis. Excessive consumption of vitamin A appears to be teratogenic. At least seven case reports of adverse pregnancy outcome have been associated with a daily ingestion of 25,000 IU or more.[56] These data are derived from 11 Adverse Drug Reaction Reports, associated with the use of vitamin A during pregnancy, that were filed with the Food and Drug Administration (FDA). Almost all of the FDA cases are brief retrospective reports of malformed infants or fetuses exposed to supplements of at least 25,000 IU of vitamin A per day during pregnancy. In addition, epidemiologic evidence indicates that the drug Isotretinoin (used for treatment of cystic acne) causes major malformations involving craniofacial, central nervous system, cardiac, and thymic changes.[57–59] Isotretinoin is a vitamin A analogue. The Teratology Society urges that women in their reproductive years be informed that excessive use of vitamin A shortly before and during pregnancy could be harmful to their babies.[60] This group also suggests that manufacturers of vitamin A-containing supplements lower the maximum amount of vitamin A per unit dosage to 5,000 to 8,000 IU and identify the source of vitamin A. They further support the practice of labeling products containing vitamin A to indicate that consumption of excessive amounts of vitamin A may be hazardous to the embryo or fetus when taken during pregnancy, and that women of childbearing age should consult with their physicians before consuming these products.

Zinc deficiency. Considerable interest has developed of late concerning the significance of zinc deficiency in adverse pregnancy outcomes. Zinc deficiency is highly teratogenic in rats and leads to the development of a variety of congenital malformations. Nonhuman primates are also affected. Abnormal brain development and behavior have been described in offspring of zinc-deficient monkeys.[46]

Limited epidemiologic evidence suggests that the malformation rate and other poor pregnancy outcomes may be higher for populations in which zinc deficiency has been recognized.[46] Women with low serum levels of zinc demonstrate a high incidence of abnormal deliveries, including congenital malformations.[25] Women with acrodermatitis enteropathica (a genetic disorder of zinc metabolism treated effectively with supplemental zinc) show pregnancy outcomes much improved from those of women in the past, when supplemental zinc was not employed.[26] Finally, plasma zinc concentrations were significantly lower in the blood of 54 women giving birth to congenitally malformed babies than in the blood of control mothers.[27]

While the potential value of zinc supplementation has been examined in several populations, the data are judged to be insufficient to mandate the institution of preconceptional zinc supplementation practices at this time. However, since zinc intake of premenopausal women is marginal at best (9-11 mg/day), prenatal nutrition counseling might appropriately include guidelines for optimizing zinc intake.

Substance use/abuse

Alcohol. During the past 15 years, research has confirmed that excessive consumption of alcohol adversely affects fetal development. In 1973, researchers described a unique set of characteristics of infants born to women who were chronic alcoholics. These infants exhibited specific anomalies of the eyes, nose, heart, and central nervous system, accompanied by growth retardation, small head circumference, and mental retardation. This condition is now recognized as fetal alcohol syndrome (FAS). It is estimated to occur in approximately one to two infants per 1,000 live births in the United States.[61]

The impact of more moderate levels of alcohol consumption on fetal development has also been the focus of much research. It is now appreciated that moderate drinkers may produce offspring with fetal alcohol effects (more subtle features of FAS). Such women also demonstrate a higher rate of spontaneous abortion, abruptio placentae, and low birthweight delivery.[62] All women planning for conception should be advised to avoid alcoholic beverages. Women with known addiction to alcohol should be strongly encouraged to enroll in a treatment program and to abstain from unprotected sexual activity if treatment is unsuccessful.

Caffeine. The possible danger of caffeine to the developing fetus has been examined in several animal models. Massive doses appear to be teratogenic in rats and mice,[63] but the effects of smaller quantities have not been satisfactorily examined. During the past decade, at least eight studies have dealt with the relationship between birth defects in children and the caffeine consumption of their mothers. No associations have been found. In one study, more than 12,000 women were questioned soon after delivery about coffee and tea consumption.[39] No relationship was found between coffee and tea consumption and low birthweight, premature delivery, or any excess malformations among their babies. Another study published the same year involved 2,030 infants examined for a relationship between their mothers' caffeine intake during pregnancy and six specific birth defects (inguinal hernia, cleft lip with and without cleft palate, isolated cleft palate, cardiac defects, pyloric stenosis, and neural tube defects).[64] The findings were negative, and the authors concluded that maternal ingestion of caffeine in tea, coffee, and cola has a minimal effect, if any, on the incidence of those six birth defects.

Provocative, however, is a prospective cohort study involving over 3,000 women in Connecticut.[65] Almost 80 percent of these pregnant women used some caffeine daily, and 28 percent consumed ≥150 mg caffeine each day. This latter group of moderate to heavy users of caffeine was significantly more likely to experience late-first and second trimester spontaneous abortions than were nonusers and light users (0–149 mg daily) of caffeine. While this report does suggest some cause for concern, the authors wisely point out that confirmation of these findings through additional research is essential before implicating caffeine in the etiology of spontaneous abortion.

Overall, data obtained from human populations do not provide convincing evidence that caffeine affects embryonic development. Even so, common sense should prevail, and women considering pregnancy might legitimately be advised to use caffeine in moderation if they choose to use it at all.

Aspartame. Since the approval of aspartame for use in carbonated beverages in 1983, there has been debate about the safety of this sweetener in the diets of pregnant women. Major concerns have been voiced about the added phenylalanine load since high circulating levels of phenylalanine (as are seen in women with poorly controlled phenylketonuria) are known to damage the fetal brain. However, individuals who do not have phenylketonuria (PKU) have plenty of phenylalanine hydroxylase activity in the liver to prevent any substantial and sustained rise in serum phenylalanine following the consumption of aspartame-rich beverages or foods. Since *no* data exist to suggest that use of aspartame-containing products is associated with adverse pregnancy outcomes, it seems unreasonable to direct women to avoid this alternative sweetener.

Control of chronic disease

Data supporting the value for the fetus of preconceptional or very early prenatal control of certain chronic diseases are now abundant. Good examples of the effectiveness of these early interventions are maternal phenylketonuria and insulin-dependent diabetes mellitus (IDDM). Metabolic control of both diseases involves conscientious dietary manipulation well before the critical period of embryonic development. In the case of women with PKU, restriction of dietary phenylalanine is mandatory, as is satisfying the protein and other nutrient requirements of mother and fetus. Data indicate that the IQ of the offspring is inversely related to the maternal serum phenylalanine concentration during pregnancy.[66] The woman with IDDM must control blood glucose levels through careful food selection and scheduled meal timing, in concert with the administration of insulin. In a nonrandomized study of diabetic women in Europe, preconceptional control of IDDM was associated with a reduction in the incidence of congenital malformations to that of the nondiabetic control population.[67]

	Malformation rate
Nondiabetic women (n=420)	1.4%
IDDM women (n=420)	5.5%
With early counseling (n=128)	0.8%
With counseling after 8 weeks' gestation (n=292)	7.5%

In a large multicenter study in the United States during the early 1980s, very early prenatal intervention for management of IDDM was associated with a marked reduction in the congenital malformation rate, but the rate was not reduced to the low level of the control population.[68]

	Malformation rate
Nondiabetic women (n=468)	3.5%
IDDM women with late counseling (n=296)	13.0%
IDDM women with counseling at 15–21 days postconception (n=409)	6.0%

The incidence of spontaneous abortion was also significantly reduced in this early counseled population, presumably due to improved metabolic control.[69]

It therefore makes sense that efforts should be made preconceptionally to motivate women with controllable diseases to prepare themselves for conception by initiating those dietary and other necessary lifestyle changes that will allow each of them to offer to her conceptus the optimum maternal metabolic milieu. This can certainly be said for women with IDDM and PKU, but it also applies to women with other chronic diseases. Not only will such efforts reduce morbidity and mortality of offspring, but they may also improve the health and well-being of the mother during the prenatal period.

Nutrition During the Postpartum Period

The nutrition demands on the lactating woman are directly related to the volume of milk production. For typical women in the United States, daily milk production (once lactation is established) is about 750 ml/day in the first six months and 600 ml/day in the second six months. Since each 100 ml of milk is known to contain about 70 kcals, the energy content of one day's milk is approximately 525 to 420 kcals. It is assumed, however, that the efficiency with which maternal energy is converted to milk energy is 80 percent, so that the average woman would require an additional 640 kcals in the first six months and an additional 510 kcals in the second six months. But since maternal fat stores theoretically provide 100 to 150 kcals per day during a six-month lactation period, the average allowance of 500 kcals per day is recommended throughout lactation.[13]

The composition of human milk is partially determined by the dietary patterns of the mother. If the mother prefers to eat vegetable oils instead of animal fats, her milk will be much more unsaturated in its fatty acid content than is the milk of a mother with more traditional dietary patterns. Concentration of various water-soluble vitamins in the milk reflects the maternal dietary adequacy or inadequacy for most of these vitamins. It appears, however, that the production of high-quality milk is a major physiological priority during lactation. If the mother's diet is poor in nutrients such as protein and calcium, her milk will still provide the usual amounts of these nutrients until frank depletion of the maternal stores takes place. It is possible, therefore, for the lactating mother to become nutritionally debilitated if her diet is poor. Her volume of milk production will certainly be reduced, with the consequence that the infant will demonstrate inadequate growth.

The Institute of Medicine Subcommittee on Nutrition During Lactation (1991) recommended that there should be a well-defined plan for the health care of lactating women that includes screening for nutritional problems and providing dietary advice.[70] The committee recommended that lactating women should be encouraged to obtain their nutrients from a well-balanced, varied diet rather than from vitamin-mineral supplements, and that women who plan to breastfeed or are breastfeeding should be given realistic health-promoting advice about weight changes during lactation. The full committee report[70] includes discussions of the assessment of nutritional status of lactating women, meeting maternal nutrient needs during lactation, and recommendations for clinical practice.

Women who choose not to breastfeed obviously do not require extra nutritional support. They do, however, require satisfactory nutrition. Observations of formula-feeding mothers indicate that they frequently take on weight reduction programs to augment the rate of loss of the pregnancy-induced fat pad. These diets are sometimes very restrictive, so that maternal energy level and overall health may deteriorate. It is not unreasonable to propose that aggressive dieting with its accompanying side effects may reduce the ability of the mother to "mother" her infant. If dieting is viewed as essential, methods of promoting gradual weight loss should be advocated.

The Interconceptional Period

The period between pregnancies, like the preconceptional period discussed earlier, is a time to optimize maternal nutrition reserves and reduce those risk factors which have been identified in the postpartum period or earlier. Weight gain or weight loss may be desirable, as may changes in patterns of alcohol or caffeine use, smoking, exercise, or drug use/abuse. Metabolic diseases should eventually be brought under control. Lowest levels of risks associated with pregnancy are generally seen when the interconceptional period exceeds one year. In any case, planning for conception is strongly recommended by health care professionals concerned with reducing maternal and infant mortality. Insurance coverage of preconceptional/interconceptional care is easily justified, not only because of the potential health benefits to mothers and children, but also because of the anticipated cost-effectiveness of such a policy.

Issues and Recommendations

Since nutrition counseling—and in some cases, the provision of extra food—is associated with improved pregnancy outcome, the following recommendations are appropriate for providers of prenatal care:[41, 71]

1. Nutrition Assessment and Monitoring

Preconception care—all women

Preconception care should be available to all women and should be integrated into primary care settings. Preconception nutrition care should include nutrition assessment, nutrition counseling, and appropriate supplementation and referral to correct existing nutrition problems prior to conception.[41]

Initial prenatal visit—all women

The nutrition status of all women should be evaluated at their first prenatal visit. This evaluation should include:

- diet history, including food habits, attitudes, and folklore; allergies; use of vitamin and mineral supplements; and lifestyles (e.g., substance abuse);
- measurement of height and weight;
- screening for anemia by hematocrit and/or hemoglobin.[71]

Subsequent visits—all women

Weight gain should be monitored, and the pattern of weight gain should be evaluated at each visit. Screening for anemia should be repeated at least once during the prenatal period.[71]

Subsequent visits—women at nutrition risk

Women at nutrition risk should have their nutrition status reevaluated at each visit.[71]

2. Nutrition Supplementation and Counseling

All women

Age, cultural, and language appropriate nutrition counseling should be provided to each woman in order to develop an acceptable food plan. Prenatal nutrition counseling should also include discussion of infant feeding options.

Women at nutrition risk

Women at nutrition risk should be provided with an individualized dietary intervention which includes a balanced increase in calories and protein.[41] The provision of iron and vitamin supplements may be justified for some high-risk women, along with counseling on the *possible* effect of folic acid supplementation during the first trimester for women who have delivered infants with neural tube defects.

Women with low incomes

Women with low incomes should receive assistance in obtaining additional food. The primary sources should be the WIC program and the Food Stamp program. In some instances, recommendation of the use of food pantries, soup kitchens, and similar facilities may be required.

From a public health perspective, policymakers can assist in efforts to assure that pregnant women have access to satisfactory prenatal nutrition services. Specifically, the following recommendations are in order:[71]

1. Food supplementation and nutrition education
   - Food supplementation and nutrition education should be available to all pregnant women with low incomes (e.g., below 200 percent of poverty).
   - Additional federal funds should be appropriated for the WIC program to make it available to all pregnant low-income women.
2. Medicaid
   - Nutrition counseling and education should be provided to all pregnant women whose care is financed by Medicaid.
   - State Medicaid programs should be required to include nutrition counseling and education as reimbursable services.
3. Health department clinics and community health centers
   - Nutrition counseling and education should be provided to all pregnant women who seek care at health department clinics and community health centers.
   - Federal and state funds should be appropriated for health department clinics and community health centers to allow them to employ professional nutrition staff on a full-time or part-time basis.

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Infant Nutrition

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Nutrition is critical in the first year of life when nutrient requirements are the highest because growth and development are more rapid in infancy than at any other time. Weight usually triples or quadruples the birthweight in the first year. Feeding nourishing foods to infants promotes good health, and age-appropriate feeding practices selected on the basis of the developmental readiness of infants help build positive attitudes about food and eating. Warm relationships develop when infants are fed in pleasant and relaxed environments by caring persons. This chapter provides a brief overview of nutrition requirements, discusses infant feeding and national health objectives, and highlights selected pediatric nutrition issues.

Nutrient Requirements of Infants

The nutrient requirements of normal infants are derived through three general approaches. The most commonly used method is to estimate nutrient requirements from observations of ad libitum intakes of human milk and corresponding nutrient concentrations in the milk of healthy populations. The second is the factorial method. This approach is based on measurements of body composition; growth rates; and various estimates of the efficiency of nutrient utilization, subsuming bioavailability, obligatory losses, and other characteristics of the biological value of foods. The two best examples of this second approach are theoretical estimations of protein and energy requirements. The third method is the "titration" of nutrient intake against biochemical measurements such as serum or urinary concentrations (or activities) of targeted nutrients, enzymes, or other metabolites of interest.

None of these approaches is wholly satisfactory because functional endpoints which emphasize specified capacities or long- or intermediate-term health consequences are seldom identified clearly. This general shortcoming is a consequence of relatively new expectations that focus on (1) the provision of active protection against acute and chronic disease by dietary means, and (2) the desire for dietary guidelines that promote optimal physical well-being and cognitive development. These expectations differ fundamentally from the limited desire to avoid pathology. None of the methods presently in use for estimating nutrient needs of infants were designed to meet these higher objectives. The current Recommended Dietary Allowances are shown in figure 4.1 and are discussed later in this chapter.

Current research in infant nutrition demonstrates the above concerns in a number of areas. Many are evident in recent evaluations of health outcomes related to breastfeeding, e.g., evaluations of normal growth, protection against acute infections, associations with intermediate-term outcomes (cancer, diabetes, and cognitive development), exposure to environmental contaminants, and unknown risks of pathogens (HIV and hepatitis B). Other issues are more long standing (e.g., iron deficiency and the association of diet with chronic conditions such as cardiovas-

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Figure 4.1: Recommended Dietary Allowances for infants

Nutrient	Age 0.0–0.5 years	 0.5–1.0 years
Kcals/kg	108	98
Protein (g)	13	14
Vitamin A (µg RE)	375	375
Vitamin D (µg)	7.5	10
Vitamin E (mg alpha-TE)	3	4
Vitamin K (µg)	5	10
Vitamin C (mg)	30	35
Thiamin (mg)	0.3	0.4
Riboflavin (mg)	0.4	0.5
Niacin (mg NE)	5	6
Vitamin B6 (mg)	0.3	0.6
Folate (µg)	25	35
Vitamin B12 (µg)	0.3	0.5
Calcium (mg)	400	600
Phosphorus (mg)	300	500
Magnesium (mg)	40	60
Iron (mg)	6	10
Zinc (mg)	5	5
Iodine (µg)	40	50
Selenium (µg)	10	15

Source: Food and Nutrition Board, National Research Council, National Academy of Sciences. (1989). *Recommended dietary allowances* (10th ed.). Washington, DC: National Academy Press.

cular disease and obesity). Some issues have received limited attention because of technological difficulties (e.g., nutrition requirements of very low birthweight infants), an inadequate understanding of relevant basic biology/physiology (e.g., dietary needs of infants with genetic predispositions to conditions such as obesity or atherosclerosis), or de facto low priority (nutrition needs of children with chronic diseases, e.g., sickle cell, diabetes, inflammatory bowel disease, cystic fibrosis, and various physical handicaps). Although a comprehensive review of these issues is beyond the scope of this chapter, a brief discussion of issues related to low birthweight infants and those with other abnormalities is included. Selected examples of research directions relevant to public health issues are also presented.

Current Issues in Infant Nutrition

Growth in breastfed infants

The breastfed infant has been chosen arbitrarily as the reference for evaluation of nutrition status during infancy. Gross energy intakes of one-month-old, exclusively breastfed infants are generally similar to recommended amounts of metabolizable energy. However, by four months of age, gross energy intakes are below energy recommendations.[1] In a manner that is somewhat analogous to what occurs with intake data, the growth of exclusively breastfed infants also deviates from that in accepted references.[2–6] Longitudinal studies suggest that weight-for-age and weight-for-length percentiles are not maintained during periods of exclusive breastfeeding or mixed feeding.[2, 3, 6, 7] The growth pattern observed during these periods does not conform to the expectation that infants track age- and sex-adjusted anthropometric percentiles established in early infancy.

The significant discrepancy between mean energy recommendations and observed energy intakes, the downward trend in age- and sex-adjusted anthropometric percentiles among exclusively breastfed infants, and the higher energy intakes of formula-fed infants may lead some to conclude that exclusive breastfeeding is inadequate by the third or fourth month. This conclusion requires, however, that present recommendations regarding energy intake and growth be accepted as valid for all dietary groups of infants, and that National Center for Health Statistics (NCHS) anthropometric references[5] be viewed as appropriate for all feeding groups. Alternatively, the estimates of energy needs and the appropriateness of growth references developed from primarily formula-fed populations may be questioned when applied to predominantly breastfed populations.[4, 6]

Studies of energy intake and growth during the period of mixed feeding (i.e., feeding with human milk and solid food) have observed that the intake of human milk decreases significantly following the addition of solid foods. The decrease in milk intake appears to be progressive and approximately proportional to concurrent increases in energy intake from solid foods. The net result is no difference in energy intakes expressed on a body weight basis (kcal/kg body weight) before and after the addition of solid foods to an exclusive human milk diet. The downward trend in age- and sex-adjusted anthropometric percentiles also continues.

These types of data are also helpful in the evaluation of present dietary recommendations which encourage the limitation of fat to approximately 30 percent of energy intake.[7] The substitution of milk with foods with a lower fat content is common in the early stages of weaning. The percentage of dietary calories from fat may reach levels of 30 to 35 percent as cereals, fruits, vegetables, and meats are added to the diet. Studies by Dwyer et al.[8] suggest that these levels of fat should not be detrimental under normal circumstances. However, as the intake of human milk decreases in absolute and relative terms following the introduction of solid foods, the nutrient density of the complementary components requires attention if adequate intakes of key nutrients (e.g., iron, zinc, and protein) are to be maintained.

A recent study by Dewey and her collaborators has been undertaken to document growth patterns and nutrient intakes of infants breastfed for 12 months.[3] Weight-for-age Z-scores for boys fell from approximately 0.9 at birth to 0.1 at 12 months and for girls from approximately 1.0 at birth to 0.6 at 12 months in preliminary data reported at a recent international meeting. Changes in length-for-age percentiles showed a more complex pattern. Dewey et al. examined the weight characteristics of infants relative to the timing of the introduction of solid foods.[3] They found that weight-for-age Z-scores tended to be lower among infants offered solid foods early (16 to 23 weeks) than among those to whom solid foods were introduced after 23 weeks, but that differences lessened with age. The decrease in Z-scores did not reach levels that cause clinical concern regarding failure to thrive. The persistence of falling Z-scores during the period of ad libitum mixed feeding suggests that the growth patterns were not the result of a lack of food.

The emerging hypothesis is that observed growth patterns represent trajectories of healthy breastfed infants and support the need for further studies that focus on functional consequences of diverse intakes and growth patterns. Functional studies have been initiated. These suggest that minimal rates of energy expenditure, heart rates, and core temperatures may be lower in breastfed than in formula-fed infants. The implications of those findings and observed growth patterns are unclear in light of recent nutrition surveillance reports which identify short stature (height-for-age below the 5th percentile) and overweight (weight-for-height above the 95th percentile) as the most prevalent nutrition-related problems defined by anthropometry.[9]

Breastfeeding and protection against acute infection

Three mechanisms by which human milk constituents protect infants from infection have been proposed. Two are based on the immunologic factors in milk and the third on its high nutrient value. The more convincing of the two immunologic mechanisms is that specific human milk constituents interact with the infant's epithelial surfaces or with specific nutrients and/or potential pathogens in the gastrointestinal lumen during the digestion and absorption of human milk. Those interactions may kill potential pathogens, prevent the pathogen's invasion of the gastrointestinal tract, and/or impair the pathogen's reproduction. Evidence for such interactions is strong. It falls into three categories: in vitro demonstration of functional abilities, in vitro measurements of the resistance of these proteins to proteolytic digestion, and observations of higher levels of immunologic proteins in the feces of infants fed human milk.

The other immunologic mechanism is the direct modulation of the infant's immune system by factors in the milk.[10–11] This mechanism may result in the selective production of immune factors by the infant. No conclusive data have been published to demonstrate that either mechanism explains the putative protective effects of human milk or that the mechanisms are mutually exclusive.

The third protective mechanism relates to the nutrient composition of human milk. Human milk's high nutrient bioavailability and biological value promote the infant's nutritional well-being, which is viewed as protective; rates of infection are expected to be minimized when the infant is well-nourished.

Comparisons of morbidity between breastfed and formula-fed infants have demonstrated significantly fewer and less severe illnesses in breastfed infants; more recent studies have related frequency or severity of specific types of infectious illnesses to specific antibody levels in human milk.[12–15] A few studies have found no differences,[16, 17] but none have reported increases in morbidity among breastfed infants compared to those fed with formula. Most studies associate the lowest morbidities with exclusive breastfeeding and the highest rates of illness with complete weaning. Morbidity in partially breastfed infants lies between those extremes.[18, 19] Generally, available evidence indicates that breastfeeding reduces the incidence and severity of gastrointestinal illnesses. Its effects on respiratory illnesses are less clear. Incidence does not appear to be affected, but severity appears to be less among breastfed infants.

Survey data presented in favor of human milk's direct protective effects are disputed because of confounding or modifying environmental and demographic variables that are difficult to control.[20] Variables such as the degree of preventable contamination of formula, the number of caretakers with whom the index child has contact, and the behavioral characteristics of the caretaker (e.g., sanitation practices and other mothering skills) cannot be controlled easily. Each factor is a potential determinant of morbidity. Nevertheless, whether the protective properties of human milk are evident or quiescent because of environmental and behavioral variables, potential benefits are available to the infant only if the infant is breastfed.

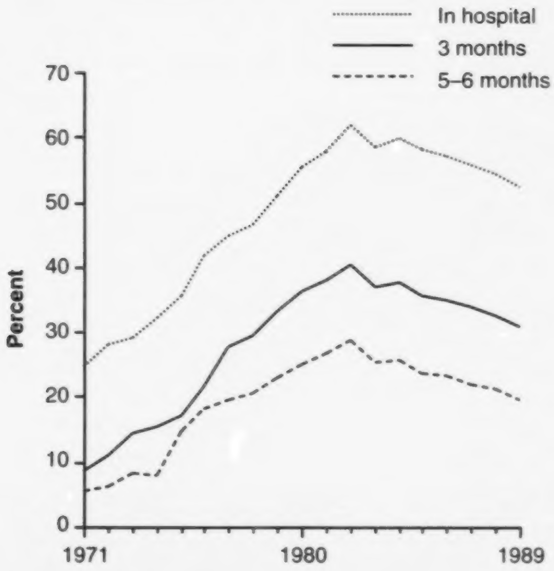
Declining incidence of breastfeeding

Figure 4.2 indicates that between 1978 and 1983, the incidence of breastfeeding increased from 47 percent to 61 percent nationally, with considerable variation among sociodemographic groups.[21] Higher-educated women are more likely to breastfeed (figure 4.3). Breastfeeding both in the hospital and after six months is considerably higher for women who have attended college. Breastfeeding rates continue to be highest among women who are older, better-educated, relatively affluent, and/or living in the western United States.[21] The lowest rates of breastfeeding occur among younger, less well-educated, black women in the southeastern United States (figure 4.4).[21]

In the 1980s, the incidence of breastfeeding declined from a high of 62 percent in 1982 to 52.2 percent in 1989.[21] There has been much speculation on the reasons for this decline, including the lack of a support system in the community for women who choose to breastfeed and the lack of adequately trained health professionals to provide breastfeeding management. Female employment has also been suggested as a determinant of breastfeeding, with the proportion of women with children younger than two years working full- or part-time increasing from 45 percent in 1983 to 52 percent in 1987.[22] Recent data in 1988 show that the percentage of women who ever breastfeed is similar among full-time working women (53 percent) and nonemployed women (53 percent).[22, 23] However, at five to six months, only 11 percent of women who work full-time are still breastfeeding, compared to 24 percent of women who work part-time and 25 percent of unemployed women.[23] Lack of maternity leave, no facilities for expressing milk or child care at the worksite, and lack of information on how women can continue breastfeeding while working may be barriers to women continuing to breastfeed while working.[22]

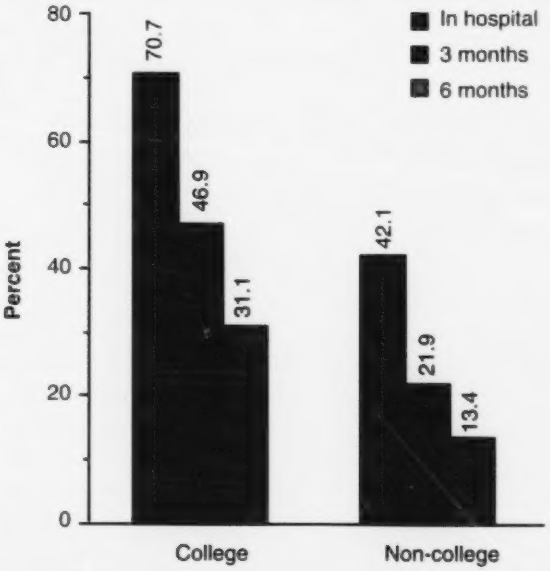
Reaching pregnant women early is critical since the decision to breastfeed is made before pregnancy by more than half of the women. Two areas of research which need further investigation are (1) the behav-

Figure 4.2: Percent breastfeeding: 1971–1989 all races



Source: Office of Maternal and Child Health, Public Health Service, U.S. Department of Health and Human Services. (1989). *Child health USA '89.* Washington, DC. U.S. Department of Health and Human Services.

Figure 4.3: Percent breastfeeding by education: 1989



Source: Office of Maternal and Child Health, Public Health Service, U.S. Department of Health and Human Services. (1989). *Child health USA '89.* Washington, DC: U.S. Department of Health and Human Services.

Figure 4.4: Breastfeeding of infants born to ever-married mothers 15–44 years of age, according to selected characteristics of mother: United States, 1981 to 1987[a]

	Percent breastfeed at all		*Percent breastfeed 3 months or more*	
	1981–83	1984–87	1981–83	1984–87
Total	58.20	59.00	39.00	33.80
Race				
White	62.00	62.10	41.90	35.70
Black	30.30	30.20	17.70	16.20
Education				
Less than 12 years	30.10	30.70	12.00	16.00
12 years	54.00	50.90	31.90	25.70
13 years or more	71.50	73.30	54.60	45.20
Geographic region				
Northeast	65.70	70.50	51.10	44.50
Northcentral	58.10	53.70	38.50	28.30
South	47.40	47.90	26.90	25.10
West	73.10	77.20	51.70	48.30

Source: National Center for Health Statistics, Centers for Disease Control. *National survey of family growth.* 1988. Hyattsville, MD: National Center for Health Statistics.

[a] Characteristics of mothers are reported as of the interview date in 1988.

ioral/cultural/social aspects of lactation in particular segments of our society, including barriers to the initiation and continuation of breastfeeding, and (2) an evaluation of strategies designed to motivate and foster change in breastfeeding behavior.

Intermediate-term outcomes and infant feeding choice

The effect of feeding with human milk or formula on energy intakes, growth patterns, and morbidity has raised the possibility that feeding choice has intermediate-term health consequences for infants. Two recent epidemiologic investigations illustrate the types of issues which are becoming increasingly prominent. Mayer and her group[24] reported the results of a retrospective study designed to investigate two hypotheses: (1) that the proportion of children with insulin-dependent diabetes mellitus (IDDM) who were breastfed as infants will be smaller than that of healthy nondiabetic children, and (2) that the duration of breastfeeding will have been shorter for those diagnosed with IDDM than for healthy nondiabetic children. Cases were less likely to have been breastfed than were controls after adjustment for birth year, maternal age, maternal education, family income, race, and sex. The adjusted odds rate was 0.70 (the 95 percent confidence interval was 0.50 to 0.97). The results also suggested that the risk of IDDM fell with the duration of breastfeeding. Earlier studies examining the same issues have not found an association between breastfeeding and IDDM. Design difficulties that focus on accuracy of recall of feeding history, the various environmental and behavioral variables that affect infant feeding choice, and the lack of a definite biological explanation require that these findings be examined closely and that studies of this type be repeated.

The second example is provided by the report by Davis and coworkers.[25] They tested the hypothesis that an association exists between artificial feeding and childhood cancer. The authors suggest that human milk's immune constituents have a direct influence on the infant's immune system and that failure to provide human milk for a sufficiently long period of time somehow increases the child's risk of cancer. Breastfeeding categories included exclusive breastfeeding and mixed feeding. Children in the formula-fed category received no human milk. Children who were formula-fed or breastfed for less than six months were at increased risk for developing cancer before the age of 15 years as compared to children breastfed for longer than six months. The risks of formula-fed children and of children breastfed for less than six months were 1.8 and 1.9, respectively. Odds ratios adjusted for sex, birth year, birth order, day care before the age of two, maternal age, maternal education, maternal race, family income, and maternal smoking during pregnancy were similar to the crude odds ratios. The difference in risk among groups was accounted for largely by the risk of lymphoma. The crude odds ratio corresponding to the risk of developing lymphoma was 5.6 for the formula-fed group and 8.2 for the group that was breastfed less than six months. The 95 percent confidence intervals corresponding to those odds ratios overlapped significantly.

Neither study is conclusive, but they illustrate the type of investigation necessary to evaluate the impact of feeding choice on intermediate-term health outcomes. If these studies are supported by future investigations, strong rationales will be developed for the assessment of the underlying mechanisms responsible for protection against disease.

Iron and other nutrient deficiencies

Anemia and the related changes in erythrocyte structure are late manifestations of iron deficiency and occur after the body's iron stores are depleted. Late effects of iron deficiency on the blood's oxygen-carrying capacity affect cardiovascular function and physical work performance. More subtle functional changes may occur long before those late effects. Mild iron deficiency, defined on the basis of the status of iron stores rather than on the basis of the presence of anemia, may result in impaired behavior, development, and intellectual performance in young children.[26, 27] This condition may decrease the responsiveness, activity, and attentiveness of children, thereby influencing learning ability.[27] Those impairments may not be fully reversible following iron repletion. Differences between control and iron-deficient children appear to increase with the children's ages, indicating that the severity of impairments may be a function of the deficiency state's duration. This relationship suggests that deficits may be cumulative and that inadequate iron stores are associated with lowered functional abilities before overt disease as conventionally defined appears.

Those observations are difficult to interpret confidently because many of the reported behaviors may be the result of the child's social environment. However, rather than viewing the social environment and the diet as independent modulators of learning ability, we should consider the possibility that physiological impairments caused by less-than-optimal intakes of iron or other nutrients are exacerbated by social conditions. This illustrates a potential interaction among the environment, nutrient intakes, and functional outcomes. A child who lives in a socially deprived environment may be less able to compensate for cognitive impairments associated with inadequate nutrient intakes than is a child who lives in socially enriched surroundings. These considerations are particularly relevant because of the increased incidence of iron deficiency among the children of the nation's poor.

Other nutrients also merit careful consideration. Generally, the vitamin D status of breastfed infants is normal when the mother's vitamin D status is adequate and the child is exposed to sunlight regularly. However, a marginal vitamin D status is reported among populations with low sun exposure. Normal 25-OH-vitamin D levels appear to be maintained in infants exposed to sunlight approximately 30 minutes per week if they wear only a diaper or exposed to sunlight two hours per week if they are fully clothed.[29] Increased rates of breastfeeding among urban populations, especially those with pigmented skin, also suggest that supplementation with vitamin D should be considered to avoid the occurrence of vitamin D deficiency or overt rickets.

Vitamin K levels in human milk[30] are also low, and there is inadequate information regarding vitamin K metabolism in childhood. Recent studies continue to document that infants who are not supplemented with vitamin K at birth run unacceptably high risks of vitamin K deficiency and its most severe manifestation, hemorrhagic disease of the newborn.[30]

Fluoride has also been of concern. It is not considered an essential nutrient but is beneficial in the prevention of caries. While there is no evidence that fluoride intake in infancy protects permanent teeth against caries, it appears to protect deciduous teeth. The American Academy of Pediatrics has published a supplementation schedule that varies according to local water fluoride content.[31]

Nutrition and low birthweight infants

Each year, more than a quarter of a million low birthweight infants (less than 5 1/2 pounds) are born, and nearly 50,000 are born with very low birthweight (less than 3 1/4 pounds) in the United States. Low birthweight is the primary risk factor for infant mortality and is strongly associated with infant morbidity, including congenital malformation, developmental disabilities, cerebral palsy, and other handicaps.[32] Nutrition counseling and supplemental foods for pregnant women are among the important interventions which reduce the risk of low birthweight.

Nutrition plays a major role in the survival of low birthweight infants. Their nutrient needs are generally proportionately greater than those of term infants because of the former group's more rapid growth rate and less efficient intestinal absorption. The goals of nutrition management for the low birthweight infant are achievement of age-adjusted intrauterine growth rate, restoration and continuing support of metabolic functions, and normal system development.[30, 33, 34] Unfortunately, the majority of studies on low birthweight infants have focused on the healthiest premature infants. The efficacy of feeding human milk to ill infants or less stable premature infants cannot be evaluated confidently by extrapolating from studies of well premature or term infants. The limited availability of minimally invasive or noninvasive methods of assessment of nutrient utilization and function in these populations, and experimental design issues common to all clinical studies of medically unstable conditions, are likely to continue to limit the information base needed to further develop tested nutrition management protocols for these populations. The roles of human milk, artificial formula, and mixtures of human milk and selected supplemental nutrients remain controversial in the nutrition management of low birthweight or ill infants.

From a more practical standpoint, the nutrition management of low birthweight, ill, and other high-risk neonates varies in complexity and usually requires highly specialized personnel and facilities.[34] Adequately trained nutrition personnel are expected to enhance the effectiveness of multidisciplinary teams in charge of the care of those infants.

Inadequate nutrition care for infants with special health care needs

Among the pediatric population are infants with special health care needs; their nutrition status may be compromised, and they often require specialized nutrition management. As noted in chapter 7, the term *infants with special health needs* usually refers to those who are at risk of physical or developmental disabilities, or who are affected by chronic medical conditions caused by or associated with (1) genetic/metabolic disorders, (2) physical birth defects, (3) prematurity, (4) trauma or infection (including human immunodeficiency virus [HIV] infection), or (5) perinatal exposure to drugs and subsequent serious emotional/behavioral disorders or mental retardation. Thirty to forty percent of infants born to HIV-infected mothers will become symptomatic, and approximately 375,000 drug-affected infants are born annually.[32] Such conditions often require extended periods of care and periodic hospitalization.

Although strides have been made in enhancing the nutrition care of those infants, many care providers cannot screen and adequately identify the nutrition problems of such infants, provide the indicated nutrition interventions, or assist parents and families in the management and provision of the required nutrition care. The discharge and follow-up plans essential to sound nutrition management often receive little attention, and community-based nutrition support services are commonly nonexistent.

In addition to special needs infants, there are an increasing number of infants living in families who are below or at the poverty level and who receive care in alternative settings such as homeless shelters, homes for battered women and children, rehabilitation centers for substance abuse, and even prisons. An increasing number of infants who are victims of child abuse and neglect in their own homes are also recognized. With the increasing number of women entering the labor force, infants receiving out-of-home care may also present special challenges. The nutrition support and care of potentially vulnerable infants warrant increased attention from all concerned with the health of children.

Continued prevalence of poor infant feeding practices

The introduction of solid foods before four to six months and the feeding of solid foods in nursing bottles are among the poor feeding practices still common.[35-37] Surveys continue to find that a variety of solid foods are fed during the early months of the first year, despite recommendations that solid foods be delayed until the infant is developmentally ready (usually by four to six months of age). For example, a survey of infants attending child health clinics in New York City reported the common introduction of cereal, fruits, sweets, and family foods during the first month.[36, 37] Current perceptions of health workers is that these practices remain unchanged. Human milk and iron-fortified formula provide infants with the energy and the essential nutrients needed for growth during the first four to six months of life. There is no known physiological or other benefit to the earlier introduction of solid foods. On the other hand, the premature introduction of supplementary foods may predispose some infants to infections, allergic reactions, and other negative outcomes.[38, 39]

In a survey conducted in New York City, many infants up to 7 to 12 months of age were reportedly fed solid foods in nursing bottles.[36, 37] Although cereal was the most frequent food added to the bottle, fruits, vegetables, and meats were also added. This practice was found among various cultural groups and may reflect culturally based behaviors rather than newly acquired practices. Feeding solid foods from a bottle, especially for an extended period of time, may delay the normal development of chewing and swallowing skills. Infants who are allowed to suck from a bottle for extended periods are also at increased risk for dental problems.[30] Severe multiple caries occur in infants whose teeth remain in contact with cariogenic nutrients for prolonged periods (e.g., infants who continue to suck throughout periods of sleep). Feeding solids in bottles appears to increase the risk and severity of caries.

Another area of concern is that as more families change their eating habits and follow the Dietary Guidelines for Americans, a few over-zealous parents may severely limit their infants' intake of fat, causing them to fail to thrive. The American Academy of Pediatrics' Committee on Nutrition recommends against fat reduction for children under two years of age.[40] The Advisory Committee on the Dietary Guidelines for Americans notes that the dietary guideline on fat is not for children under two years of age.[41] Fat should not be unduly restricted in infancy by such practices as feeding skim milk. A breastfed infant receiving recommended intakes of solid foods for age and development is likely to be consuming adequate but not excessive amounts of dietary fat.

Limited data base in infant nutrition

Many efforts have been made to improve the infant nutrition data base. Most of these have been focused on nutritional status (e.g., the Pediatric Surveillance System and the Health and Nutrition Examination Survey). Less attention has been directed to data about the behavior and practices of child caretakers in relation to infant feeding. Agencies and individuals providing child health services are frequently in a position to survey the nutrition/child feeding beliefs and practices of those they serve. Such information could improve the data base and be used to improve counseling, educational services, and materials development. Often, helpful and hard-to-obtain information about infant feeding practices, particularly of various ethnic and cultural groups, is contained in the personal experience and files of public health nurses and others who work closely with such groups in clinics, home visits, and other community service programs.

Standards and Guidelines Available

Promoting Health/Preventing Disease: Year 2000 Objectives for the Nation

Nutrition is important for every person throughout the life cycle, but it is especially important for mothers, infants, and children since they are among the most vulnerable groups in the population. The development of national health objectives reflects growing concern about health promotion and disease prevention. From 1980, when the first health objectives were published, nutrition was a cross-cutting issue in many of the 15 priority areas identified in *Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention*.[42] Subsequently, as the health issues were refined, three of the priority areas emerging in the Year 2000

National Health Objectives related directly to infants and young children.[43]

One objective is to reduce growth retardation in children age five and under to less than 10 percent. The accepted definition of growth retardation is height-for-age below the fifth percentile in the reference population of the National Center for Health Statistics.[5] To improve linear growth, practical intervention strategies include improved nutrition, better diagnosis and treatment of infectious diseases, and access to and use of comprehensive health care services by caretakers of infants and young children.

The second objective is to reduce the risk of iron deficiency to less than 5 percent among children ages one to two and to less than 2 percent for children ages three to four. Iron deficiency is reported to be the most common single-nutrient deficiency in the United States.[9, 44] As previously noted, mild iron deficiency, defined on the basis of the status of iron stores, may have negative effects on the performance of children. Significantly, children from families with incomes below the poverty line and black children show a higher prevalence of anemia as compared to children who are above the poverty line and white.[9]

A third objective relates to breastfeeding, which is the optimal way for mothers to nourish and nurture their infants.[45, 46] The pattern of nutrients, growth factors, enzymes, hormones, and anti-infective and anti-inflammatory factors in human milk is thought to promote infants' general well-being. One of the Year 2000 National Health Objectives is to increase to at least 75 percent the proportion of mothers who exclusively or partially breastfeed their infants in the early postpartum period, and to increase to at least 50 percent the proportion who continue to breastfeed until their infants are five to six months old.[43]

Recommended Dietary Allowances (10th ed.). (1989).

The Recommended Dietary Allowances (RDAs) for infants (figure 4.1), developed and updated periodically by the Committee on Dietary Allowances of the Food and Nutrition Board, the National Academy of Sciences, are "the levels of intake of essential nutrients that, on the basis of current scientific knowledge, are judged to be adequate to meet the known nutrient needs of practically all healthy infants."[1] The RDAs are neither minimal requirements nor necessarily optimal levels of intake. They are safe and adequate levels (incorporating margins of safety intended to be sufficiently generous to encompass the presumed variability in requirements among infants) reflecting the state of knowledge concerning a nutrient, its bioavailability, and variations among the United States population. The RDAs provide allowances for energy, protein, and 18 vitamins and minerals for infants birth to six months and six months through 1 year. Estimated safe and adequate daily dietary intakes are provided for seven vitamins and minerals for which there are not enough data to set an RDA.

The Pediatric Nutrition Handbook

The Pediatric Nutrition Handbook,[30] published by the Committee on Nutrition, American Academy of Pediatrics, provides a source of information on current nutrition science as it pertains to infants and children. The handbook for health professionals contains basic nutrition information and information on feeding normal infants and children, vitamin and mineral supplementation, and nutrition in disease.

The RDAs and *The Pediatric Nutrition Handbook* have long served as basic references in infant nutrition. Federal, state, and local governments, professional and voluntary health agencies, educational institutions, industry, and others have translated these groups' recommendations into practical guidelines for infant feeding and made them widely available to health professionals, parents, and families. Examples include *Infant Care*,[47] published by the Department of Health and Human Services; *Feeding Your Baby: The First Year*,[48] available from the American Dietetic Association; and *Florida's Infant Feeding Guide*,[49] published by the Florida Department of Health and Rehabilitative Services. The RDAs and the *Pediatric Nutrition Handbook* have been used to establish policies for food assistance programs[50] and group care facilities for infants (e.g., day care centers and hospital nurseries).[51]

Recommendations

Nutrition training of health professionals. Efforts should be continued to improve the nutrition knowledge base and practical skills of health care providers who influence the nutritional well-being of infants and their families.

Nutrition counseling and education. All parents (and surrogate caretakers) should have the opportunity to receive counseling and education about infant nutrition. Such counseling and education should be adapted to the economic, cultural, ethnic, social, and other circumstances of the families who are served.

Breastfeeding support. Efforts to support breastfeeding should be strengthened in both the public and private sectors, with specific emphasis on groups with lower rates of breastfeeding.

Nutrition and feeding guidelines. Agencies responsible for the administration of health, social, and related program services for infants should develop nutrition and feeding guidelines, update them as necessary, make them widely available, and support in-service training of personnel expected to apply the guidelines to assure quality and consistency of nutrition care.

Enhancement of research base. Research which addresses current issues in infant nutrition (e.g., behavioral and social aspects of lactation in specific population groups, nutrition requirements of special needs children, and intermediate- and long-term consequences of feeding practices) should receive high priority in the allocation of public and private research funds.

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Child Nutrition

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This chapter provides a brief review of child nutrition among normal children and those with special developmental and health needs. More detailed information on these conditions is found in several recent reviews.[1-10] Nutrition during childhood is essential for growth and for the maintenance of child health. Food is a source of sensory pleasure and the basis for much companionship and pleasure during this and other stages of life.

Nutrition Needs

Nutrient needs

The 1989 Recommended Dietary Allowances (RDAs) for energy are presented in figure 5.1.[11] Those for infants and for children aged 7 to 10 are lower than in previous editions of the RDAs because new information on actual intakes shows that previous recommendations have been too high. Figure 5.2 presents similar information on micronutrient requirements.[11] Few changes from previous RDAs are apparent. The major changes from the 1980 RDAs are slight decreases in folic acid, vitamin B_{12}, and magnesium, and the addition of recommendations for vitamin K and selenium.

Additional diet recommendations summarized in the *Surgeon General's Report on Nutrition and Health* include reducing the consumption of fat (especially saturated fat) and sodium, achieving and maintaining a desirable weight, increasing the consumption of complex carbohydrates and fiber, and assuring adequate fluoride intake while limiting amount and frequency of sugar consumption to decrease the risk of dental caries.[12] *Diet and Health,* the report of the National Academy of Sciences,[13] makes more quantitative recommendations for decreasing the risk of chronic degenerative diseases among members of the population over two years of age. These include decreasing fat intake to less than 30 percent and saturated fat intake to less than 10 percent of caloric intake; limiting cholesterol intake to 300 mg per day; eating at least five servings of fruits and vegetables each day; eating at least six servings of breads, cereals, or legumes each day; and moderating protein intake. The report also suggests maintaining an appropriate body weight, limiting

Figure 5.1: Median heights, weights, and average recommended energy intakes for children

Age (years)	Weight (kg)	Height (cm)	REE[a] (kcal/day)	Average Energy Allowance[b] (kcal/kg/day)	Average Energy Allowance (total kcal/day)
1–3	13	90	740	102	1,300
4–6	20	112	950	90	1,800
7–10	28	132	1,130	70	2,000

Adapted from: Food and Nutrition Board, National Research Council, National Academy of Sciences. (1989). *Recommended dietary allowances* (10th ed.). Washington, DC: National Academy Press.

[a] Calculation based on FAO equation, then rounded.

[b] In the range of light to moderate activity, the coefficient of variation is 20 percent.

Figure 5.2: Recommended Dietary Allowances for children: Vitamins and minerals

Fat-Soluble Vitamins

Age (years)	Vit A (µg RE)	Vit D (µg)	Vit E (mg TE)	Vit K (µg)
1–3	400	10	6	15
4–6	500	10	7	20
7–10	700	10	7	30

Water-Soluble Vitamins

	Vit C (mg)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vit B6 (mg)	Folate (µg)	Vit B12 (µg)
1–3	40	0.7	0.8	9	1.0	50	0.7
4–6	45	0.9	1.1	12	1.1	75	1.0
7–10	45	1.0	1.2	13	1.4	100	1.4

Minerals

	Ca (mg)	P (mg)	Mg (mg)	Fe (mg)	Zn (mg)	I (µg)	Se (µg)
1–3	800	800	80	10	10	70	20
4–6	800	800	120	10	10	90	20
7–10	800	800	170	10	10	120	30

Adapted from: Food and Nutrition Board, National Research Council, National Academy of Sciences. (1989). *Recommended dietary allowances* (10th ed.). Washington, DC: National Academy Press.

salt intake to six grams or less per day, maintaining adequate calcium and fluoride intakes, and avoiding supplements in excess of the RDA. Following these recommendations assures that balance and moderation, as well as nutrient adequacy, will be attained in planning diets.

Developmental needs

Nutrient intakes are important, but children eat food in a social milieu. Therefore, their developmental, cultural, and emotional needs must also be taken into account in planning their food intakes. Figure 5.3 summarizes some guidelines for promoting good nutrition during childhood which may provide helpful anticipatory guidance to parents.[14] Principles which are important for enhancing the nutrition and quality of life of children with special developmental and health needs are also considered. The nutrition-related services for children which should be provided by direct health care services according to the recently released report of the U.S. Preventive Services Task Force are summarized in figure 5.4.[4]

Conditions Increasing Nutrition Risks

Primary and secondary malnutrition

Two basic types of malnutrition need to be considered. Primary malnutrition is

Figure 5.3: Guidelines for promoting good nutrition during childhood, including concerns of special needs children

Infants (6–18 months)

- Assure gradual transition to family diets rather than attempting to wean suddenly.
- Introduce solid foods after 4–6 months when child is developmentally ready.
- Take common problems (such as temporary refusal of foods with a new texture) in stride.
- Help and encourage self-feeding.
- Realize that some decrease in appetite in late infancy is to be expected as growth slows.
- Avoid struggles and battles of will about food.
- Keep environment safe and begin to teach child to shun mouthing and eating of nonfood items.

Preschool Children

- Assure that levels of physical activity and rest suffice to maintain normal growth and development.
- Provide nutritious food in the home and at school to encourage good food choices.
- Teach the child to choose and eat nutritious foods for meals and snacks.
- Avoid sticky sugary snacks to promote good dental health.
- Foster appropriate eating behaviors by providing suitable role models, permitting the child to make some decisions about types and amounts of foods eaten, fostering table manners appropriate to his/her development, and keeping eating times for peaceful social interchange.
- Avoid the excessive use of food for emotional purposes.
- Handle struggles over food reasonably to avoid the development of feeding problems.
- Feed and hydrate children appropriately during illness.
- Help children grow out of fatness by encouraging physical activity.

School-Aged Children

- Monitor growth in height and weight to assure that nutritional status is satisfactory.
- Provide good examples and guidance to instill healthy eating habits and attitudes about foods and eating. (Develop regular eating patterns; eat nutritious snacks as well as meals; use moderation in providing food rewards, especially sweets; encourage the child to eat breakfast; and help the child become a sophisticated and responsible food consumer.)
- Establish consistent guidelines and follow them to assure that the child's diet is nutritionally adequate.
- Promote eating and physical activity habits which will foster normal body fatness.
- If excessive fatness is a problem, encourage child to increase physical activity and help him/her to cut energy intake slightly so that the child can grow out of his/her fatness.
- Assure that diet-related risks of dental caries can be minimized.

Children with Special Needs

- Recognize that expectations for growth may be different; use appropriate standards when available.
- Provide adequate nutrition to achieve optimal growth potential.
- Consider the extra or lessened energy needs due to the child's condition and adjust intake accordingly.
- Use vitamin and mineral supplements if directed by physician.
- Frequently evaluate adequacy of child's diet.
- Insure adequate intake of fluid and fiber.
- Consult an interdisciplinary team and develop a care plan which includes realistic expectations regarding the child's potential; understanding of feeding skill progression and recognition of developmental readiness for next step; and enrollment in early intervention program as needed.
- If warranted, adjust feeding positioning to allow for adequate food intake, use appropriate nipples and feeding devices for children unable to use standard equipment, and adjust pace of feeding appropriately.
- Determine family's need for food assistance, support with home and money management, diet information, and emotional support.

Figure 5.4: Nutrition-related services which should be provided in direct health care services

Age	Usual Services	
	Screening	Counseling
Birth–18 months	Height Weight Hemoglobin Hematocrit Erythrocyte protoporphyrin	Diet: Breastfeeding Nutrient intake, especially iron foods Dental Health: Baby bottle tooth decay
2–6 years	Height Weight Blood pressure Erythrocyte protoporphyrin	Diet and Exercise: Sweets Between-meal snacks Iron-rich foods Sodium Caloric balance Selection of exercise program
7–12 years	Height Weight Blood pressure	Diet and Exercise: Fat (especially saturated fat) Cholesterol Sweets Between-meal snacks Caloric balance Selection of exercise program

Source: U.S. Preventive Services Task Force. (1989). *Guide to clinical preventive services.* Washington, DC: Government Printing Office.

due to a lack of, excess of, or imbalance of a nutrient or nutrients in the diet. It may arise when an individual does not get enough to eat because of poverty or because of some other factor such as inappropriate feeding techniques or food selection. Secondary malnutrition is the result of a disease or illness which has secondary effects on dietary intake, nutrient needs, or metabolism, and hence on nutrition status.

Primary and secondary malnutrition appear in six general forms. Some are associated with insufficiency. These include *starvation*, having so little food to eat that energy and other nutrient requirements fail to be met, as among children who are neglected and suffer from nonorganic failure to thrive (FTT); *undernutrition*, which involves simply not getting enough food or energy; and *deficiencies* of vitamins and minerals such as iron, fluoride, and vitamin D. Other forms of malnutrition involve excesses, rather than shortages, of intakes. They include *overnutrition*, involving excessive caloric intake over energy needs; *imbalances*, such as diets which have too much fat, saturated fat, cholesterol, sugar, and sodium, or too little starch or fiber; and *toxicities* due to the ingestion of excessive amounts of a nutrient which causes poisoning, such as lead poisoning or hypervitaminosis A and D.

The types of malnutrition associated with insufficiency (undernutrition, starvation, and deficiencies) are common among those who do not get enough to eat because of poverty and food scarcity. The poor live in an affluent society and face not only the problems of dietary inadequacy, but also the ills of affluence such as obesity, dietary imbalances, and toxicities. The causes of these dietary inadequacies and imbalances are complex. Often many problems complicate the situation. These include lack of money to spend on food, unwise food purchases, difficulties in child rearing and home management, behavioral and emotional problems, learning difficulties, lack of general health education, lack of information and age-specific anticipatory guidance, and the presence of disease. Children who suffer from poverty-related malnutrition today include members of poor families who are also in racial and ethnic minority groups; those whose families have physical, emotional, or mental health problems; and those who are afflicted with other problems such as homelessness, putting them in double jeopardy.

The malnutrition of affluence is also common among children from higher income families. They frequently suffer from overnutrition, dietary imbalances, and excesses which increase the risk of chronic degenerative disease and obesity. The causes of these problems include inappropriate environments for health promotion; inadequacies in child rearing and home management; behavioral, emotional, and learning problems which adversely influence food intake; and failure to apply nutrition principles relating to child rearing.

Malnutrition associated with infectious disease is on the decline today among children. This is due in part to better health education, increased emphasis on anticipatory guidance, earlier recognition and prevention, better medical means of treating many disorders, and greater access to health services. However, certain types of nutrition difficulties, such as those involving long-term illnesses or handicapping conditions, are still apparent. More children with birth defects, Down syndrome, cystic fibrosis, cerebral palsy, spina bifida, respirator dependence, and AIDS are surviving today than in the past due to medical advances. Current estimates of the prevalence of these handicapping conditions is provided in figure 5.5. Undernutrition, starvation, and deficiencies of vitamins and minerals are often associated with these conditions rather than with diet per se. Dietary lacks develop secondarily when food intake falls off due to lack of appetite. For example, a child afflicted with cerebral palsy or cancer might suffer from malnutrition in spite of abundant food in his/her environment because of an inability to eat it.

Some examples of the more common forms of malnutrition among children are discussed in greater detail below.

Obesity

Childhood obesity is one of the most prevalent nutrition disorders among children today. Prevalence estimates range from 10 to 30 percent, the variation due to lack of a single common definition.[15,16] Obesity in children is generally defined in relation to standardized growth charts. Weights-for-height greater than the 90th percentile or weights greater than 120 percent of the median weight-for-height are considered obese. Using growth charts as reference standards presents problems because children vary greatly in the timing and coordination of their growth spurts in weight and height. Skinfold measurements are often used as adjuncts to weight and height measurements for defining obesity. Children with skinfolds exceeding the 85th percentile are classified as obese.

Childhood obesity has negative impacts on health. Some very obese children suffer from immediate adverse physical manifestations such as hypertension, respiratory problems, hyperlipidemias, orthopedic problems, and hyperinsulinemia. In childhood, however, the most common consequences are psychosocial, including disturbed family interactions, peer disapproval, academic discrimination, low self-esteem, and poor self-image. These

Figure 5.5: Estimated prevalence of chronic diseases and conditions in children ages 0–20 in the United States (1980)

Disorder	Prevalence Estimates Per 1,000	Range of Referenced Estimates, Per 1,000
Asthma	38.0	20.0–53.0
Moderate to severe	10.0	8.0–15.0
Visual impairment	30.0	20.0–35.0
Impaired acuity	20.0	
Blind	0.6	0.5–1.0
Mental retardation	25.0	20.0–30.0
Hearing impairment	16.0	
Deafness	0.1	.06–.15
Congenital heart disease	7.0	2.0–7.0
Severe	0.5	
Seizure disorder	3.5	2.6–4.5
Cerebral palsy	2.5	1.4–5.1
Arthritis	2.2	1.0–3.0
Paralysis	2.1	2.0–2.3
Diabetes mellitus	1.8	1.2–2.0
Cleft lip/palate	1.5	1.3–2.0
Down syndrome	1.1	
Sickle cell disease	.46	
Sickle cell anemia	.28	
Neural tube defect	.45	
Spina bifida	.40	
Encephalocele	.05	
Autism	.44	.40–.48
Cystic fibrosis	.20	
Hemophilia	.15	
Acute lymohocytic leukemia	.11	
Phenylketonuria	.10	
Chronic renal failure	.08	
Terminal	.01	
Nonterminal	.07	
Muscular dystrophy	.06	
Traumatic brain injury	.05	

Source: Gortmaker, S. L., and Sappenfield, W. (1984). Chronic childhood disorders: Prevalence and impact. *Pediatric Clinics of North America* 31(1): 3–18.

emotional and psychological factors often initiate a vicious cycle of low self-esteem, social isolation, physical inactivity, and the use of food for nonnutritious reasons, resulting in a lifestyle that perpetuates the obesity.[17]

Obesity during childhood also increases the risk of becoming an overweight adult. Fat children are likely to become fat adults. The correlation between childhood obesity and later obesity increases as children get older, with correlations explaining from 15 to 80 percent of the variance.[15–17] Obese adults are known to have higher rates of diabetes, hypertension, heart disease, and orthopedic problems, as well as immediate psychological, social, and emotional disturbances.

Sound programs for the prevention or treatment of obesity should be individualized, nutritionally sound, psychologically sound, supportive of social needs, and diversified. They should include an activity portion, coordinated with medical care and continued over a long enough period for attitude and behavioral change to occur. Also, they should stimulate changes in knowledge, attitudes, and practices which permit the child to grow normally and develop a positive attitude toward life and self, not merely a focus on weight loss. Lastly, they should be based on the premise that there is a wide range of acceptable body sizes and shapes, and be reasonably priced.[18]

Failure to thrive

Failure to thrive is a term which implies growth retardation due to a variety of causes. Sometimes an organic basis (e.g., a physical or biochemical abnormality) for the growth failure can be identified, but in the majority of outpatient cases, the etiology is nonorganic, involving problems in the child's psychosocial and social environment which result in the growth failure. There are, however, mixed organic and nonorganic causes of failure to thrive in which both medical problems and disturbances in the home environment contribute to disturbed growth patterns. The criterion to identify an FTT child is weight loss or a drop-off in height of two standard deviations from normal growth, or a deviation in growth below the third percentile in weight or height on growth charts, after correcting for parental height.[19] Malnutrition is common among FTT children. Treatment should focus initially on the alleviation of nutrition deficits and consideration of nutrition issues of a social and psychosocial nature.[20, 21]

Children who suffer from severe FTT of long duration, especially when they are under one year of age, are at high risk for lasting deficits in growth, cognition and socioemotional functioning.[19]

The primary goal of treatment for FTT is to evaluate the implications of the nutritional, medical, psychosocial, and developmental factors which are involved. This is best undertaken by a coordinated multidisciplinary team of a pediatrician, nutritionist, social worker, and nurse. Consultation may also be needed from mental health professionals and physical and occupational therapists.

The nutrition-related aspects of treatment include dietary assessment, including attainment and analysis of 24-hour recall and food diaries; development of a feeding schedule; alteration in knowledge and health beliefs of caretakers, if needed; individualized nutrition instruction which includes recommendations to meet increased nutrient needs for catch-up growth; and attention to maladaptive feeding practices and nutrition misperceptions. Finally, ongoing height, weight, and fatness measurements should be included so that if relapse occurs, it is identified early.[20, 21]

The medical management of FTT includes a history and physical exam, assessment of perinatal risk factors, interruption of the infection/malnutrition cycle, and identification and treatment of elevated blood lead levels and chronic diseases if they are present. Psychosocial aspects of FTT that should be considered are assessment of economic circumstances, identification of family disturbances, evaluation of any feeding disorders which are present, ruling out of child abuse/neglect, and individualization of interventions to deal with other special problems of parents and children.[21] The social and psychological treatment of the family can then proceed.

Iron deficiency anemia

Iron deficiency anemia (IDA) is the most common cause of anemia among children today. Anemia is defined as having lower than normal concentrations of hemoglobins or hematocrits. By convention, the lower limit of normal is set at two standard deviations below the mean level for the healthy population of the same age.

The prevalence of iron deficiency in the National Health and Nutrition Examination Survey II (NHANES II) of 1976–80 was 9.3 percent, 4.3 percent, and 3.9 percent for age groups 1–2 years, 3–4 years, and 5–10 years, respectively.[12] Iron deficiency is most common between the ages of six months and three years, secondary to rapid growth and milk as the main source of calories. Iron status frequently improves during the preschool and preadolescent years because of increased opportunity to obtain iron from a mixed diet. Much improvement has been made in decreasing the prevalence of IDA. Rates are still considerably higher among low-income and minority children, however, than among more affluent groups.[22]

Physiological function can be affected by impaired iron status even before anemia becomes apparent. The International Conference on Iron Deficiency and Behavioral Development concludes that there is an association between IDA and suboptimal behavior, as demonstrated by lower scores on tests of development, learning, and school achievement.[23] IDA, when it is severe, is associated with behavioral signs such as apathy, inattentiveness, irritability, and memory deficits. Other consequences of very severely impaired iron status may include problems with body temperature regulation and decreased resistance to infections.

In cases of severe IDA, pharmacological doses of iron can reverse the behavioral problems caused by the deficiency and replete iron stores. Steps to prevent IDA include breastfeeding, the use of iron-fortified commercial formulas, the addition of iron drops to homemade formulas, the inclusion of iron-rich foods in the diet, and participation in federal food programs such as the Special Supplemental Food Program for Women, Infants, and Children (WIC) and the School Lunch Program that focus on the provision of food sources which are high in iron and vitamin C. Increasing iron intake from iron-rich foods and fortified foods can be accomplished by providing plenty of animal foods, especially sources of heme iron such as lean meats and poultry which are a highly bioavailable form of iron. Iron-fortified cereals are also helpful. Including foods rich in vitamin C with meals further increases iron bioavailability.

Dental caries

Dental caries are a serious childhood disease which affects 98 percent of all American children.[24] A susceptible tooth, cariogenic bacteria, and sugar are the three factors necessary to initiate tooth decay. Caries are caused by the acid produced by cariogenic bacteria from fermentable carbohydrates in the diet. Caries can be prevented by good oral hygiene, by avoiding cariogenic foods, and by other means. Adequate intake of fluoride during tooth development has been shown to decrease the rate of dental caries.

Diet and nutrition play an important role in causing or preventing the development of dental caries. The cariogenicity of an individual's diet is related more to the frequency of intake of sticky sugar-containing foods which cling to the teeth than to the total amount of sugar in the diet. Foods which are sticky and are retained on the teeth, or foods the teeth are exposed to for long periods of time, such as sugary sodas sipped throughout the day or hard candy sucked for hours, can be especially harmful. The risk of dental caries can be decreased by avoiding the practice of allowing infants to go to sleep with a bottle of milk or juice so that it can pool and ferment around developing teeth; restricting sugary foods to mealtimes; and brushing teeth immediately after the consumption of sugary foods.

Diet control is only one part of a complete dental health program, however. Children also require exposure to fluoride, either in the water supply or in a supplement while their teeth are growing. Adequate cleaning of the teeth from the time they erupt is also essential. Professional preventive dental care should be sought no later than the age of three.

High blood pressure

Adult blood pressures are correlated with childhood blood pressures, body size, and fatness. In adult populations, elevated blood pressures are related to the development of occlusive atherosclerosis, stroke, and renal disease.[26] Therefore, even though overt hypertension is rare during childhood, it is important to act to reduce higher pressures when they are present in children.[25]

The nutrition-related steps which are most helpful in decreasing the risk of high blood pressure involve obesity control.[26] Children who already exhibit blood pressures which are consistently in the upper percentiles, especially if there is a family tendency toward hypertension, need additional special attention. Increased physical activity, moderation in energy intake to better control weight, and moderation in sodium intake may be helpful.

Hyperlipidemia

Children with excessively high cholesterol levels (e.g., >95th percentile) early in life are at risk of coronary heart disease and must be treated.[27] Such high serum cholesterols found in children are most often hereditary in nature or secondary to other diseases. The diagnosis of hyperlipidemia must be confirmed by two blood tests, done at least two weeks apart, after ruling out other causes of the hyperlipidemia. The first line of treatment is dietary intervention. This includes achieving a caloric intake to assure normal growth, decreasing total fat intake to less than 30 percent of total calories, reducing cholesterol intake to less than 300mg/day, reducing saturated fat to less than 10 percent of total calories, increasing polyunsaturated fat to 10 percent of total caloric intake, and increasing complex carbohydrates and fiber.[28] If diet alone is insufficient, drugs may be required.

Coronary artery disease (CAD) is a common disease in adults and has been shown to be linked to several modifiable risk factors, including the hyperlipidemias. High serum cholesterol is one of the most common hyperlipidemias modified by diet. Characteristics favoring CAD development are often present in childhood.[29] Some children are especially likely to develop the disease because of heredity, but a much larger group of others are at risk because of lifestyle factors which include diet. Diets designed to maintain an energy intake which sustains growth in height and weight at normal levels, increase consumption of complex carbohydrates, decrease intake of refined sugars, decrease consumption of fat (especially saturated fat) and cholesterol, and limit sodium intake can be appropriate for growing children, but special care must be taken to assure nutrient adequacy.[30, 31]

The American Academy of Pediatrics makes the following recommendations for a "prudent diet" for children:[30, 31] Dietary fat should not be restricted in infants; after one year of age, provide a varied diet from each food group to assure nutrient adequacy; detect obesity and high blood pressure and intervene if they develop; maintain desirable body weights and growth; exercise regularly; and obtain family history for chronic illnesses. Over the age of two, screening for cholesterol is in order for children with a strong family history of cardiovascular disease. Current dietary trends in the United States toward a decrease in saturated fat, cholesterol, and salt should be followed with moderation by families of such children.

Standards and Guidelines Available

Guide to Clinical Preventive Services[4]

This new guide for health professionals was prepared by the U.S. Preventive Services Task Force of the U.S. Department of Health and Human Services. It provides evidence and recommendations for over 100 preventive activities, including screening tests and interventions such as counseling, immunizations, and prophylactic measures for asymptomatic individuals of all ages and risk groups. These interventions are targeted toward reducing the incidence and prevalence of 60 preventable conditions, including cardiovascular disease, cancers, injuries, and substance abuse. Nutrition screening, counseling, and supplementation recommendations are included because they are an important part of preventive health care. Each chapter reviews the current scientific evidence, summarizes clinical research on the effectiveness of each preventive service, and makes recommendations. Also included for each targeted condition is a listing of the relevant recommendations by the major professional organizations and health agencies. Figure 5.4 summarizes the nutrition-related services which the task force recommends for inclusion in direct health care services for children.

Healthy People 2000: National Health Promotion and Disease Prevention Objectives[22]

This planning document, published by the U.S. Public Health Service of the U.S. Department of Health and Human Services, provides national objectives regarding health promotion and disease prevention. The document provides priorities in the areas of health promotion, health protection, preventive services, and system improvements. The objectives address concerns in the areas of health status; risk reduction; public awareness; professional education, awareness, and services; and protection. Twenty-four nutrition objectives are listed. Figure 5.6 presents the objectives which pertain to children. They incorporate recommendations from *The Surgeon General's Report on Nutrition and Health*[12] and the National Academy of Sciences' *Diet and Health: Implications for Reducing Chronic Disease Risk*,[13] as well as issues in the field of nutrition.

Diet and Health: Implications for Reducing Chronic Disease Risk[13]

In 1989, the Committee on Diet and Health of the Food and Nutrition Board, Institute of Medicine, National Research

Council, National Academy of Sciences, published its report on the relationship between diet and chronic illnesses affecting the U.S. population. The following dietary recommendations apply to adults and children over the age of two years. The report suggests reducing total fat to less than 30 percent and saturated fat to less than 10 percent of caloric intake; limiting sodium chloride and cholesterol intake to 6 g and 300 mg, respectively; eating at least five servings of fruits and vegetables and at least six servings of complex carbohydrates per day; maintaining appropriate body weight, moderate protein intake, adequate calcium intake, and optimal fluoride intake; and avoiding taking daily supplements in excess of the RDAs.

Recommended Dietary Allowances. 10th edition (1989)[11]

The Recommended Dietary Allowances are the result of efforts by the Committee on Dietary Allowances of the Food and Nutrition Board of the National Research Council, Institute of Medicine, National Academy of Sciences. The RDAs reflect the current opinions of experts on "the levels of intake of essential nutrients that are judged to be adequate to meet the known nutrient needs of practically all healthy persons." The RDAs provide allowances for energy, protein, and 18 vitamins and minerals. In addition, estimated safe and adequate daily dietary intakes are provided for seven vitamins and minerals for which there is not enough data to set an RDA. They are intended for use in evaluating the adequacy of diets of groups of people, developing nutrition programs, and public health policymaking.

Other

Several professional associations, including the American Dietetic Association (ADA), the American Academy of Pediatrics (AAP), and the American Public Health Association (APHA), have also published useful standards and guidelines.[27, 30-33]

Nutrition Services Required

Nutrition is part of the entire life cycle. It is also an essential part of the comprehensive care cycle since it involves primary (prevention and risk reduction), secondary (control and curative), and tertiary (rehabilitation) preventive measures. It follows that the nutrition component of health services must be integrated into all three aspects of the comprehensive care cycle.

Figure 5.6: Healthy people 2000: National health promotion and disease prevention objectives

Health Status

Reduce growth retardation in children ages five and younger to less than 10 percent.

Risk Reduction

Reduce iron deficiency among children ages one through two to less than 5 percent and among children ages three through four to less than 2 percent.

Reduce average dietary fat intake to no more than 30 percent of calories and average saturated fat intake to no more than 10 percent of calories among people ages two and older.

Services and Protection

Increase to at least 95 percent the proportion of school lunch and breakfast services with menus that are consistent with the *Dietary Guidelines for Americans.*

Extend to all states required nutrition education from preschool through grade 12, preferably as part of a comprehensive school health education.

Source: U.S. Department of Health and Human Services. (1990). *Healthy people 2000: National health promotion and disease prevention objectives.* Washington, DC: Government Printing Office.

The planning of nutrition services involves a series of six steps. These are summarized in figure 5.7. They include documentation of need, development of goals and objectives, consideration of resources required, planning for implementation, and putting policies and procedures for implementation and evaluation into action.[39]

A comprehensive plan for child health services must involve both public health and personal health services in nutrition. Public health nutrition services include administration, supervision, consultation, training, and other indirect program management activities. These include the development of policies and tools (e.g., screening and assessment tools, policies for programs, standards of care, and training materials) which are necessary for personal health care services to be delivered smoothly.[39]

Personal health care services in nutrition include nutrition screening and assessment, development of the nutrition care components as part of total health care intervention plans, actual provision of care, related educational activities, follow-up (including monitoring, reassessment, and modification of care plans), discharge, and follow-up with evaluation.

Nutrition services provision model[40]

Problem identification. Every patient should undergo screening for the presence of characteristics which are known to be associated with nutrition problems. Screening criteria should be simple, relatively straightforward, and easy to administer. Screening serves to identify individuals at highest risk, thereby aiding in establishing priorities for the most efficient use of available time and money.

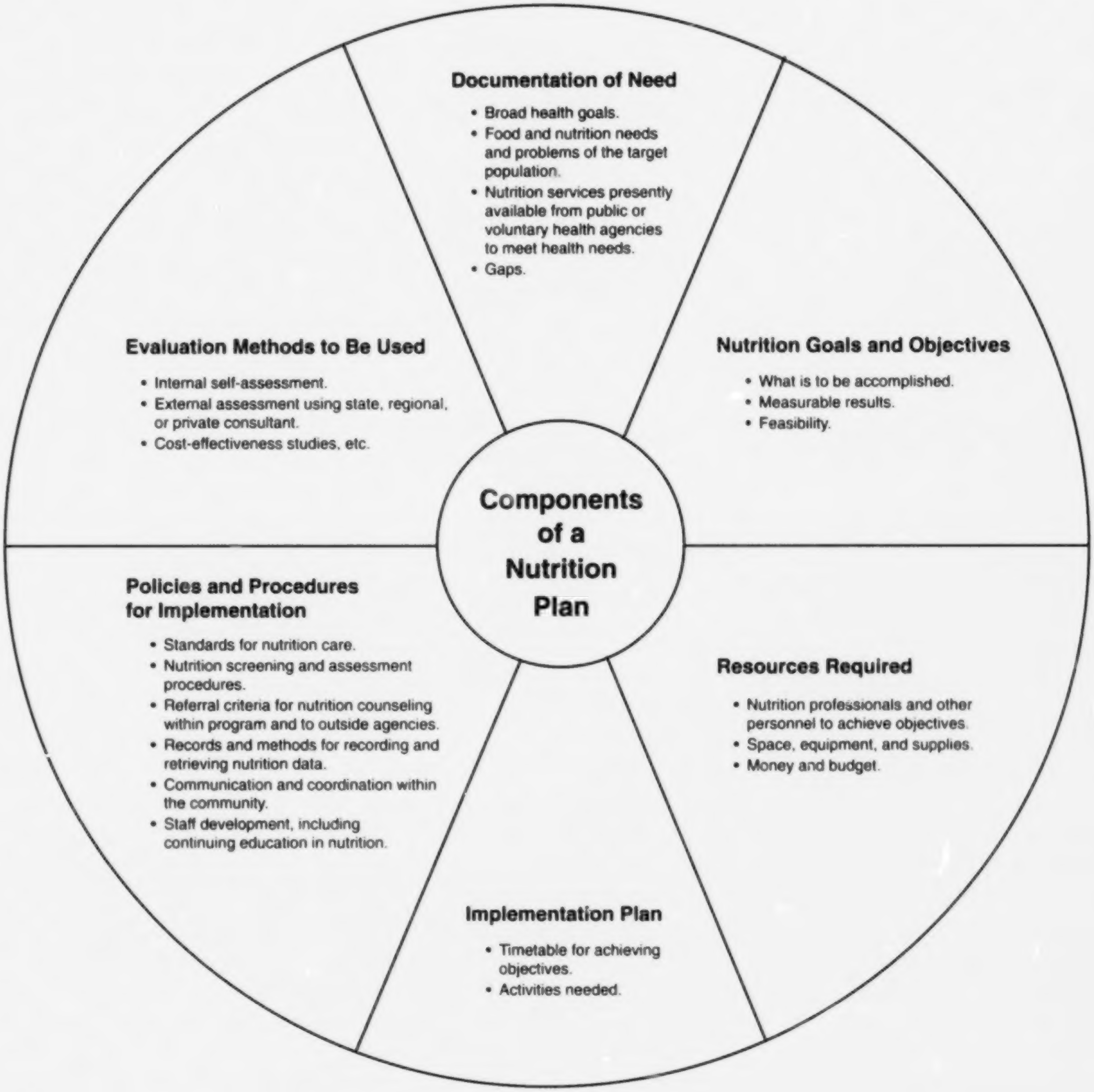
Individuals who are found through screening to be at high risk require a more detailed assessment by a nutritionist of diet, eating habits, food resources, household management, and disease-related issues which may affect nutrition status. This evaluation may also include a review of available biochemical, anthropometric, clinical, and dietary information.

Intervention. Once nutrition problems are identified through screening, intervention involves four basic approaches:

1. *Health promotion:* Factors promoting and enhancing the nutrition health of children are provided in figure 5.6. These guidelines are largely educational in nature. They need reinforcement by all health care providers.
2. *Risk reduction (primary prevention): Diet and Health,*[13] the recent report of the National Academy of Sciences, and *The Surgeon General's Report on Nutrition and Health*[12] outline recommendations to assure adequacy of the diet while helping to reduce risks for diet-related chronic degenerative diseases. The Preventive Services Task Force Recommendations are useful in planning the prevention-oriented component of individual health services at various ages.
3. *Disease treatment and control (secondary prevention):* Dietary measures can also help to control disease and alleviate symptoms of some conditions after patients become ill. For example, therapeutic diets play a role in the treatment plans for diabetes mellitus, malabsorption, obesity, and inborn errors of metabolism.
4. *Rehabilitation (tertiary prevention):* Nutrition is a vital part of tertiary prevention. This is especially important in dealing with children with special long-term developmental and health needs. For example, a child who suffers from cerebral palsy may need special assistance with feeding.

Once diet-related problems have been identified, the nutritionist is responsible for

Figure 5.7: Components of a nutrition plan


Components of a Nutrition Plan
Documentation of Need
• Broad health goals.
• Food and nutrition needs and problems of the target population.
• Nutrition services presently available from public or voluntary health agencies to meet health needs.
• Gaps.
Nutrition Goals and Objectives
• What is to be accomplished.
• Measurable results.
• Feasibility.
Resources Required
• Nutrition professionals and other personnel to achieve objectives.
• Space, equipment, and supplies.
• Money and budget.
Implementation Plan
• Timetable for achieving objectives.
• Activities needed.
Policies and Procedures for Implementation
• Standards for nutrition care.
• Nutrition screening and assessment procedures.
• Referral criteria for nutrition counseling within program and to outside agencies.
• Records and methods for recording and retrieving nutrition data.
• Communication and coordination within the community.
• Staff development, including continuing education in nutrition.
Evaluation Methods to Be Used
• Internal self-assessment.
• External assessment using state, regional, or private consultant.
• Cost-effectiveness studies, etc.

Adapted from: U.S. Department of Health, Education, and Welfare. (1978). *Guide for developing nutrition services in community health programs* (DHEW Pub. No. [HSA] 78-5103). Rockville, MD: Author.

developing an individualized care plan. This plan describes what the problems are and how needs for counseling, nutrition education, help with home and money management, food assistance, and community resources will be implemented.

Nutrition services involve a combination of interventions involving health, food, education, social, and public welfare measures. Planning for them is critical at the public health level if they are not to be neglected at the service delivery level.

Follow-up and evaluation. Follow-up and evaluation are the final steps in the nutrition care process. What has been accomplished is reviewed and linked to outcome measurements. Quality assurance involves the use of nutrition standards of care to which the quality of nutrition services can be compared. Process evaluation incorporated into the planning of the nutrition service can enhance the problem identification and management process by providing measurable end points which permit the documentation of the utility of the services provided. Monitoring is the periodic measurement of factors which indicate changes in the nutrition status of a specific group. Surveillance is ongoing data collection compiled to detect warning signs of problems at the community level. Monitoring and surveillance together can provide continuous, reliable information on the nutrition status and factors that influence the target group for ameliorative purposes.

Issues and Problems

Achieving adequate nutrition services in day care programs

The increasing number of women who are employed in the work force has lead to more and more children being cared for in settings other than their own homes, such as day care centers and neighbors' homes. The rapid expansion of day care, financial and regulatory constraints, and the health problems of some preschool children make it difficult to ensure that nutrition services are optimal in such settings. The American Dietetic Association, the American Academy of Pediatrics, and the American Public Health Association have recently suggested standards for meeting children's health, nutrition, and educational needs in day care settings.[41, 52] The Head Start Performance Standards in nutrition conform to the recent ADA and other authoritative statements on day care, and they also incorporate a strong educational focus.[43] Day care settings should be safe and pleasant environments which promote optimal physical, social, and emotional development. They should include attention to food service and meal plans, emotional climate, the physical eating environment, nutrition education, and nutrition consultation and guidance, and should conform to state and local regulations.[41]

Lack of participation in and coverage of child nutrition programs

Appropriate child nutrition services include food assistance, school food services, nutrition education, nutrition screening and assessment, and counseling for all children, regardless of the economic status of their families.[45] Some major issues include inadequacies in the number of school breakfast programs, lack of participation in other school nutrition programs by children, and lack of integration between the classroom and the school food service. The school should function as a learning laboratory in which theoretical concepts about nutrition taught in the classroom are put into action in the lunchroom.

Food assistance and food services deserve special attention. Preschool children from low-income families are especially likely to exhibit diet-related problems. Their diets are usually adequate in quantity, but they may be insufficient in quality of some micronutrients.[42] Participation in food and nutrition programs is associated with improvement in nutrition status among low-income preschoolers.[44] Since meals and snacks that children receive in day care may equal or exceed that eaten at home, it is vital that preschool nutrition be addressed in settings outside the home.

A recent national evaluation of school lunch programs found that they led to demonstrable improvements in children's diets. Children who ate school lunches had higher intakes of nutrients than those who did not, and the school breakfast program increased the likelihood that children ate breakfast.[44, 46] Since skipping breakfast may negatively affect children's performances in problem-solving situations, it is a matter of some concern that many children do not eat breakfast. It helps to provide a meal which otherwise is often missed; this meal improves child health, provides nutrition education, and may increase educational achievement.[47] Handbooks are now available for implementing school breakfast programs.[46, 48] In addition, the summer food program provides much-needed food to high-risk children of preschool and school age.

Nutrition gaps in school health services and school-based clinics[11, 45, 46]

Nutrition is an essential part of health care.[35] School health services and school-based clinics are becoming increasingly important as sources of health education, health promotion, and health care.[3] Unfortunately, even when school populations exhibit many unmet nutrition-related needs, a nutrition component is not often included in such programs. School health services need to include nutrition screening, assessment, and counseling for all children, regardless of economic status. More attention must also be paid to including behaviorally based nutrition activities in comprehensive health education.

Another component which is essential to putting nutrition into action in schools is a physical fitness program for all children, regardless of their fitness status. This is important as it initiates lifelong habits of physical activity which are helpful in keeping nutrition status constant.[36] Such programs can be helpful in improving cardiovascular fitness and in decreasing the risk of obesity, as well as serving other functions, such as providing amusement.

The need for more focus on nutrition services for children with special developmental and health needs

The special nutrition considerations relating to children with special developmental and health needs are discussed in the chapter entitled "Children with Special Health Care Needs." The basic underlying philosophy is that *all* children, including those with special needs, deserve to reach their maximal potential.[39] The special nutrition assessment and interventions which may be required are described in several recent references.[1, 39, 48]

Recommendations

Parent education

The key to good child nutrition is parental example, education, and concern. Figure 5.3 discusses some of the many steps parents can take to promote good nutrition in their children.

Public education

School-based public education relating to food, nutrition, and health must be expanded. The components include nutrition in health services, school food programs, and physical and health education, coupled with health promotion advice to children and their parents.[3, 49] The school lunchroom is another important focus for action. Behaviorally based physical education programs and health programs in the classrooms are also essential. The Year 2000 National Health Objectives recognize the importance of schools as vehicles for nutrition education, as part of comprehensive health education.[22] The needs of school-aged children whose activity is limited due to chronic conditions and other health problems are numerous and must be dealt with; these children need to be mainstreamed to the greatest extent possible.[2]

Training

The training required for public health nutrition professionals to meet these challenges is discussed in the chapter entitled "Personnel for Delivery of Nutrition Services." Public health nutritionists who are well versed in special problems and needs of well and ill children of preschool and school age are few in number and poorly paid.[50] Special attention must be directed to meeting the nutrient-related needs of handicapped and chronically ill children in usual educational settings since such children are increasingly being mainstreamed into preschool and school settings.[39] Public health nutritionists who have special skills in education will be particularly useful in these settings.

Health services

The Year 2000 National Health Objectives provide many useful steps for health services at all levels to take in meeting children's nutrition needs.[22] Steps should be taken to implement efforts to achieve these objectives.

Food services

Food services within schools should provide especially good examples of nutritious food choices. One of the Year 2000 National Health Objectives is for virtually all school lunch and breakfast services to have menus consistent with the Dietary Guidelines for Americans.[22] In addition, healthful options are needed in fast-food places and other facilities in which children eat.

Research

Many questions still exist in the area of child nutrition and deserve further research. What are the social, nutritional, and physical activity-related factors which increase risks of obesity, high serum cholesterol, high blood pressure, and other diet-related chronic degenerative diseases in preschool and school children? What types of programs are most effective in remedying these risk factors? Does impaired iron status, even in the absence of anemia, decrease performance on cognitive and attention-related tasks? Does nutrition supplementation correct these deficits? Are other types of chronic undernutrition of the mild type seen in the United States having an effect on learning? What are the most cost-effective means of dealing with the combination of excesses and insufficiencies of nutrients which characterizes the eating patterns of American preschool and school children today? How can the nutrition-related needs of infants and children with AIDS best be met?

Policy

The most critical policy issue is that nutrition services must be integrated into all aspects of child health care. Nutrition should also be integrated into day care policy as recommended by Head Start, ADA, and APHA/AAP standards.[41, 51, 52] The scope of school health services related to nutrition which reach disadvantaged children needs expansion.[44] Such health services should include, but not be limited to, nutrition. School lunch and breakfast programs must be expanded to better cover disadvantaged as well as more affluent children.[44] In addition, more choices in line with the recent *Diet and Health* report are in order.[13]

Cost benefit of nutrition interventions

The cost-effectiveness of ambulatory nutrition services-related interventions is currently a matter of much interest to planners. Existing evidence on the effectiveness of child nutrition-related services has recently been summarized.[53] There is also a good deal of solid evidence about the effects of school nutrition programs which was accumulated recently in a nationwide study.[44] Other supportive data also exist.[45, 47] At present, while definitive statements cannot yet be made, evidence is accumulating that the benefits of paying attention to nutrition in the childhood years outweigh the costs.

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Adolescent Nutrition: Trends and Critical Issues for the 1990s

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Adolescence, generally encompassing 10 to 20 years of age, is a unique and complex developmental period in which major biological, social, psychological, and cognitive changes occur. Puberty marks the beginning of accelerated physical growth and maturation, and alterations in body composition, creating an increased need for nutrients. In addition, growing independence, the need for peer acceptability, concern with appearance, and an active life-style may affect eating habits, food choices, nutrient intake, and thus nutrition status. This chapter will present major nutrition-related issues and concerns of youth today, nutrition services needed, and recommendations for improving the nutritional health of American teenagers.

Nutrient Requirements for Adolescents

The normal events of puberty influence the nutrient requirements of adolescents. Puberty is an intensively anabolic event with major increases in height and weight. Alterations in body composition, changes in the quantity and distribution of fat, and an enlargement of many organ systems characterize the adolescent growth spurt. Fifteen percent of skeletal growth occurs during adolescence. Almost one-half of the adult body mass develops during adolescence in both males and females. Since nutrient requirements are closely related to rapid increases in body weight, it is not surprising that peak nutrition requirements occur during the year of maximum growth. Few data are available on nutrient requirements that correlate with biological events during puberty. An adequate energy intake with high-quality protein is essential for optimal growth during puberty. The iron and calcium requirements of both males and females are of particular concern during adolescence.

For many of the nutrients, few data that are based on measurements in adolescents are available. This is particularly true of the vitamins and minerals. Recommended allowances are based on extrapolations from adult or child studies, with a factor built in for safety. These recommendations are shown in figure 6.1. In addition, the Dietary Guidelines for Americans include the following: eat a variety of foods; maintain healthy weight; choose a diet low in fat, saturated fat, and cholesterol; choose a diet with plenty of vegetables, fruits, and grain products; use sugars in moderation; use salt and sodium in moderation; if you drink alcoholic beverages, do so in moderation.[1] Thus a prudent diet in moderation with appropriate snacks should provide a balanced diet that will meet the nutrient requirements of teenagers.

Nutrition Issues and Concerns

The nutritional health of America's youth is far better today than at any other time in the past. With the exception of iron deficiency, overt nutrient deficiency diseases are not public health problems today as they were earlier in the century and as recently as the 1940s. As problems of nutrient deficiency have diminished, they

Figure 6.1: Recommended Dietary Allowances for adolescents

Nutrient	Males			Females		
	11–14	15–18	19–22	11–14	15–18	19–22
Protein, g	45	56	56	46	46	44
Vitamin A, micrograms RE	1,000	1,000	1,000	800	800	800
Vitamin D, micrograms	10	10	7.5	10	10	7.5
Vitamin E, micrograms	10	10	10	8	8	8
Vitamin C, mg	60	60	60	60	60	60
Thiamin, mg	1.4	1.4	1.5	1.1	1.1	1.1
Riboflavin, mg	1.6	1.7	1.7	1.3	1.3	1.3
Niacin, mg NE	18	18	19	15	14	14
Vitamin B-6, mg	1.8	2.0	2.2	1.8	2.0	2.0
Folacin, micrograms	400	400	400	400	400	400
Vitamin B-12, micrograms	3.0	3.0	3.0	3.0	3.0	3.0
Calcium, mg	1,200	1,200	1,200	1,200	1,200	1,200
Phosphorus, mg	1,200	1,200	1,200	1,200	1,200	1,200
Magnesium, mg	400	350	350	300	300	300
Iron, mg	18	10	10	18	18	18
Zinc, mg	15	15	15	15	15	15
Iodine, micrograms	150	150	150	150	150	150
Vitamin K, micrograms	65	65	65	65	65	65
Selenium, micrograms	65	65	65	75	75	75

Source: Food and Nutrition Board, National Research Council, National Academy of Sciences. (1989). *Recommended dietary allowances*, 10th ed. Washington, DC: National Academy Press.

have been replaced by problems of dietary imbalance and excess.[2] Dietary excesses of calories, sugar, fat, cholesterol, and sodium are common among adolescents and are found in all income and ethnic groups and both sexes. Inadequate dietary intakes of certain vitamins (folic acid, vitamin B_6, vitamin A) and minerals (iron, calcium, zinc) are also evident, particularly among teenagers of low socioeconomic status and among females. There is concern that certain dietary habits among adolescents may continue into adulthood. In combination with other factors, these dietary patterns could result in increased risk for chronic diseases such as heart disease, osteoporosis, and some types of cancer later on in life.

The following briefly describes some of the major nutrition-related issues and concerns for adolescents in the United States.

Undernutrition/inadequate food intake

Although great strides have been made over the past 50 years, undernutrition and inadequate food intake still exist, primarily among certain segments of the U.S. population. The highest-risk groups of adolescents for undernutrition and inadequate food intake are:

Low-income youth. In 1987, there were 13 million children under 18 years of age living in poverty.[3] For youth 14–21 years of age, 15.9 percent lived below the poverty line in 1987 compared with 13.9 percent in 1980.[4] Black or Hispanic youth are nearly three times more likely to live in poverty than are white children.[3] Female-headed families have significantly higher poverty rates than do two-parent families. In 1987, almost half (46 percent) of children living only with their mothers were poor.[3] Low-income youth are at high nutrition risk due to limited money available for food. In addition, inadequate kitchen facilities (e.g., lack of refrigeration) or lack of transportation may be barriers to obtaining an adequate diet.

The adolescent growth spurt is highly sensitive to nutrient deprivation. Inadequate nutrition during this time may delay or stunt linear growth. Both the Health Examination Survey (1963–65) and the Ten State Nutrition Survey (1968–70) found that children from low-income families were considerably shorter than children from higher-income families.[5] More recent data from the National Health and Nutrition Examination Survey II (NHANES II) (1976–80) indicate that children living in poverty are at increased risk for growth stunting as compared to their nonpoor peers and the standard U.S. reference population. Adolescents aged 12–17 were 2.7 times as likely as their nonpoor peers to be short for their age and sex.[6, 7] Low-income adolescents are also at higher risk for biochemical nutrient deficiencies, including iron, vitamin A, and folic acid deficiencies.[5] Likewise, low dietary intakes of these nutrients are found more commonly among low-income adolescents than among higher-income teenagers. All low-income families, including those with adolescents, should have access to an adequate diet.[5] In addition, monitoring and surveillance data are needed at state and national levels to accurately assess the prevalence and trends of growth and nutrition status among economically disadvantaged teenagers.

Youth with chronic illnesses and handicapping conditions. The overall rate of chronic disabling conditions among children and adolescents has been estimated to be 10–20 percent.[8] An increasing proportion of those with life-threatening chronic illnesses are surviving into adulthood, and an estimated 84 percent will reach age 20.[9] Many chronic conditions afflicting adolescents have nutrition consequences and, indeed, nutrition-related problems occur frequently. Malnutrition has been implicated as a major factor contributing to poor growth and short stature in adolescents who have a variety of diseases (e.g., chronic inflammatory bowel disease, cystic fibrosis).[10, 11] Inadequate intake, malabsorption, and increased nutrient requirements are all factors leading to the chronic malnourished state. Early assessment of nutrition status followed by nutrition intervention and monitoring will substantially help ensure the health and well-being of youth with chronic and handicapping conditions. This will require more comprehensive primary care and third-party coverage of nutrition services.

Heavy alcohol or drug abusers. Substance abuse in adolescents is a public health problem of major significance and concern. A 1988 national survey of high school seniors found that 63.9 percent reported alcohol use in the previous 30 days and 4.2 percent reported daily alcohol consumption.[12] The same survey found that 2.7 percent of high school seniors reported being daily marijuana users and 0.2 percent reported daily cocaine use. While there are little empirical data available on the nutrition status of adolescents who are chronic alcohol or drug users, adolescents who are chronic users are extremely vulnerable to nutrition problems. Poor nutrition may result from inadequate intake or, in the case of alcohol, maldigestion and malabsorption. Food is not usually given high priority, and available money often is not used for food. While insufficient data exist for adolescents, undernutrition, grossly inadequate diets, and vitamin deficiencies have been observed in both alcohol- and drug-dependent adults.[13, 14]

Runaway and homeless youth. Although data is fragmented and insufficient, it is estimated that there are more than one million teenagers who are runaways or homeless, and the number appears to be increasing. There also appears to be an increasing number of runaways who are no longer wanted at home. These "pushouts" may account for up to 28 percent of the homeless teenage street population.[9] Little is known about the nutrition status of homeless and runaway youth, but there is reason for concern about their nutrition status. A 1980 survey of 18 New York programs serving runaway or homeless youth found that most of their teenage clients had unmet health needs, including malnutrition.[15]

Youth in families where the primary caretaker is drug- or alcohol-dependent or is mentally ill. The family has predominant influence on a child's food behavior. As adolescents move toward independence and autonomy and begin to spend more time away from home, family influence shifts. It continues to have a significant impact on food habits, however. In families with poor parenting practices due to parental dependence on drugs or alcohol, or due to mental illness, children and adolescents may have inadequate diets. If teenagers are left to fend for themselves, they may not have the resources or the knowledge base to make wise food choices.

Pregnant teenagers. Studies have frequently found pregnant adolescents to have poor dietary habits.[2, 16] Typical food patterns of teenagers, such as high consumption of low-nutrient-dense snacks and erratic eating practices, may preclude an intake of the recommended nutrients. Low dietary intakes of calcium, zinc, iron, and vitamins A, C, B_6, and folate have been noted among pregnant teenagers. These nutrients, in addition to other essential nutrients and energy, are of primary importance for optimal maternal health and fetal development. Since teenage mothers are disproportionately from economically disadvantaged populations, they may lack adequate food resources.[16]

Teenagers are more likely than older pregnant women to delay obtaining prenatal care until later in their pregnancies. More outreach is needed to bring teenagers into prenatal care earlier so that they can obtain social, medical and nutrition services; be placed on the Special Supplemental Food Program for Women, Infants, and Children (WIC); and be given assistance in obtaining additional food, if needed. Adolescent pregnancy and nutrition are discussed further in the next section.

Chronic dieters. Chronic dieters are also at high risk for inadequate diets. In the Minnesota Adolescent Survey, of 17,354 females in grades 7–12, 13 percent reported they were chronic dieters (i.e., always on a diet or having been on 10 or more diets in the past 12 months).[17] Frequent dieting may interfere with physical development and mental health and well-being. In addition, more attention is now being paid to preconception nutrition status and its importance for a healthy pregnancy outcome. Chronic dieters who become pregnant may start their pregnancies with depleted nutrient reserves and be in poor nutritional health. More education is needed in the high schools on the importance of nutrition in achieving optimal reproductive outcome and on the effects of prolonged food restriction on health and well-being.

Consequences of undernutrition. Whatever the root causes of undernutrition, inadequate nutrition during adolescence may retard or stunt linear growth, lower resistance to infections and disease, impair learning ability and performance, and adversely affect the ability to function at peak physical capacity. Underweight pregnant adolescents are at risk for delivering low birthweight infants, and those who enter pregnancy in poor nutritional health with low nutrient reserves may have poorer pregnancy outcomes. Adolescents with chronic illnesses who are undernourished may have diminished quality of life and a shorter life span.

Nutrition concerns of the high-risk adolescent groups listed above generally cannot be quantified because data are unavailable for many of these groups. Consistent and ongoing monitoring of data on the health status of adolescents is extremely limited at both state and national levels. While the Centers for Disease Control (CDC) Pediatric Nutrition Surveillance System provides data on children through nine years of age, the only national data system to monitor growth and nutrition status among U.S. adolescents is the National Health and Nutrition Examination Surveys (NHANES), and these data are limited by infrequent collection and reporting cycles. Clearly, on local, state, and national levels, more data and ongoing surveillance are needed to accurately assess the prevalence and trends of growth and nutrition status among economically disadvantaged teenagers, as well as among other high-risk subgroups.

Obesity

The term obesity implies an abnormally large amount of adipose tissue. There is concern about the correlation of obesity with coronary and hypertensive heart disease. At a certain size, the adipose organ is associated with abnormal physiology and metabolism. The correlation of the degree of adiposity with abnormal physiology is not well understood.

At age 10.5, males normally have about 5.3 kilograms of fat.[18] This represents 16 percent of their body weight. By age 18, they have 9 kilograms of fat representing 12.9 percent of their body weight. Females at age 10.5 have about 8.14 kilograms of body fat. By age 18.5, they have about 14.24 kilograms of body fat, representing 25 percent of their body weight. It is clear from this data that in absolute amounts, the adipose tissue organ enlarges during adolescence. The increment is about 3.5 kilograms in males and 6 kilograms in females. Females are shorter and lighter than males by late adolescence. Females have considerably more body fat than do males. Recent attention has focused on the correlation of cardiovascular risk factors with fat distribution.[19] Upper segment obesity reflected in waist-to-hip ratios in adults correlates well with glucose intolerance, hyperlipemia, and hyperinsulinemia.

Factors responsible for obesity in children and adolescents are more identifiable now than in the past. It is not surprising that there is clear evidence of a genetic predisposition to juvenile obesity. Studies of twins have been particularly useful in identifying the genetic component of juvenile obesity.[20, 21] The precise mechanism of genetic control over the size of the adipose tissue organ has not been identified. Vigorous metabolic research over the past 30 years has failed to identify a single or multiple etiological factor. Although there is current interest in possible abnormalities of thermogenesis in obesity of children and adolescents, recent research has not borne this out.[22] Differences between energy intake and expenditure are difficult to measure with precision in humans. Recently, Garrow has suggested that it is not possible to show a significant defect in short-term regulation of energy intake.[23] Instead, he makes the case for a long-range defect in energy regulation in which cognition plays a significant role. Recently, Melbin et al. described a rather strong association between psychosocial distress and rapid weight gain in late childhood.[24] The causal relationship was strong, but it is unclear whether an etiological relationship exists. Investigators continue to explore those factors associated with or responsible for excessive and pathological obesity. In all probability, the etiology will not be a single cause. It is more likely that obesity will be found to result from an interaction between genetic, psychosocial, and as yet unknown metabolic or regulatory defects.

Obesity appears to cluster in families, so that therapeutic plans need to center around the family. Frequently, most of the family's susceptibility to obesity is genetic.[25] Family attitudes toward food practices, dietary knowledge, physical activity, body appearance, and body size are critical in designing an intervention program. There are a number of intervention programs which focus on teaching appropriate life-styles, physical activity, and concern with body image rather than being strictly dietary-restricted programs. Programs designed to include these elements plus behavioral modification have indicated some degree of success in changing behaviors and producing weight loss. Particular attention to after-school and weekend activities is essential for success in these programs. School programs in which obese adolescents have a specific daily period of vigorous aerobic exercise are important for long-term weight control.

Atherosclerosis during adolescence

Interest in atherosclerosis during the juvenile period began early in this century. It took documentation of coronary artery disease in young American soldiers killed in Korea for a focus on juvenile atherosclerosis to develop.[26]

Identification of adult risk factors depends on using specific cardiovascular events such as myocardial infarction as endpoints for the presence of atherosclerosis. The pathogenesis of myocardial infarction may be quite different from that of atherosclerosis. Factors causing arterial disease may not be the same factors causing clinical events such as ischemic heart disease.

Natural history. Fatty streaking of arteries develops rapidly during the second decade of life.[27] There are both racial and sexual differences in fatty streaking of the major vessels. White males have considerably more fatty streaking of the aorta than do white females. Black females resemble black males more closely than they do their white female counterparts. Fatty streaking is universal. The development of more advanced lesions such as fibrous plaques may be more environmentally or risk factor related.

Risk factors. In adults, the following major risk factors have been identified: age, sex, family history and genetic factors, hyperlipidemia, cigarette smoking, hypertension, and diabetes. In the current campaign to lower serum cholesterol, the major importance of cigarette smoking and high blood pressure as risk factors has not been emphasized enough. Their contribution to risk for coronary artery diseases equals to or exceeds that of hyperlipidemia.[28] Most important and in some ways still controversial is the risk associated with high levels of cholesterol. Specifically, increased levels of low-density lipoprotein cholesterol (LDL-C) and decreased levels of high-density lipoprotein cholesterol (HDL-C) are strong predictors of arteriosclerotic cardiovascular disease.[29]

Obesity is not related to fatty streaking or to raised fibrous plaques. There is no evidence that obesity functions as an independent risk factor. It may be a secondary risk factor through an association with hypertension[30] or an abnormal lipoprotein.[31] Recent data from the Bogalusa Heart Study confirms a connection between fat distribution and lipids. Truncal distribution of fat is associated with adverse concentrations of lipids, lipoproteins, and apolipoproteins.[32]

Addictive smoking behavior starts during adolescence. Cigarette smoking increases plasma levels of triglycerides and lowers levels of HDL-C.[33] These changes in lipid levels have been correlated with increased risk for atherosclerosis for subjects who begin smoking early in life. There is enough evidence that smoking is an important risk factor to justify taking vigorous measures to alter smoking behavior in the teenage years before it becomes ingrained.

Cholesterol, lipoprotein, and diet. Prior to adolescence, serum cholesterol in males and females is similar. At age 14, boys' serum cholesterol is lower than girls' and remains this way for the rest of the second decade. Data on normal values from the Lipid Research Clinic is shown in figures 6.2 and 6.3.[34] Levels of triglycerides increase in males and remain the same in females. HDL-C levels fall in males and remain the same in females. LDL-C is the same in both males and females. Very-low-density lipoprotein cholesterol (VLDL-C) is the same in both boys and girls. In Western societies, serum LDL-C is more diet sensitive while serum HDL-C is genetically regulated.

Levels of dietary cholesterol and saturated fat are associated with both serum cholesterol concentrations and mortality from coronary heart disease. In general, increases of 3 to 12 mg/dl in the serum cholesterol result from an intake of 100 mg of cholesterol per 1,000 kcal.[35] Dietary cholesterol intake above 600 mg/day has no effect on serum cholesterol.[36] The ability of the body to reduce endogenous synthesis of cholesterol in response to dietary cholesterol intake is a major factor in determining an individual's serum cholesterol value. The type of fat ingested (saturated or unsaturated) also influences serum cholesterol levels. Whether minor changes in serum cholesterol in response to dietary cholesterol is causally related to arterial disease in juveniles remains to be determined.

Figure 6.2: Normal plasma lipid concentrations in the first two decades of life (18)[a]

Age (years) and sex	Number	Cholesterol (mg/dL) 5th	Cholesterol (mg/dL) Mean	Cholesterol (mg/dL) 95th	Triglyceride (mg/dL) 5th	Triglyceride (mg/dL) Mean	Triglyceride (mg/dL) 95th
0–4							
M	238	114	155	203	29	56	99
F	186	112	156	200	34	64	112
5–9							
M	1,253	121	160	203	30	56	101
F	1,118	126	164	205	32	60	105
10–14							
M	2,278	119	158	202	32	66	125
F	2,087	124	160	201	37	75	131
15–19							
M	1,980	113	150	197	37	78	148
F	2,079	120	158	203	39	75	132

Source: Body composition during adolescence. In W. J. Klish and N. Kretchmer (Eds.), *Body composition measurements in infants and children: Report of the Ninety-Eighth Ross Conference on Pediatric Research* (p.76).

[a] Data given are from *The Lipid Research Clinic Data Book*. Lipids were determined on plasma from 11,219 fasting white subjects (5,749 boys, 5,470 girls) who were studied in seven North American Lipid Research Clinics using common protocols and laboratory methodology.

Figure 6.3: Normal plasma lipid concentrations in the first two decades of life (18)[a]

Age (years) and sex	Number of Subjects	High-Density Lipoprotein Cholesterol (mg/dL) 5th	High-Density Lipoprotein Cholesterol (mg/dL) Mean	High-Density Lipoprotein Cholesterol (mg/dL) 95th	Number of Subjects	Low-Density Lipoprotein Cholesterol (mg/dL) 5th	Low-Density Lipoprotein Cholesterol (mg/dL) Mean	Low-Density Lipoprotein Cholesterol (mg/dL) 95th	Number of Subjects	Very-Low-Density Lipoprotein Cholesterol (mg/dL) 5th	Very-Low-Density Lipoprotein Cholesterol (mg/dL) Mean	Very-Low-Density Lipoprotein Cholesterol (mg/dL) 95th
5–9												
M	145	38	56	75	132	63	93	129	132	0	8	18
F	127	36	53	73	114	68	100	140	113	1	10	24
10–14												
M	298	37	55	74	288	64	97	133	288	1	10	22
F	248	37	52	70	245	68	97	136	245	2	11	23
15–19												
M	300	30	46	63	298	62	94	130	297	2	13	26
F	297	35	52	74	295	59	96	137	295	2	12	24

Source: Body composition during adolescence. In W. J. Klish and N. Kretchmer (Eds.), *Body composition measurements in infants and children: Report of the Ninety-Eighth Ross Conference on Pediatric Research* (p.76).

[a] Lipoproteins were determined on plasma from 1,415 fasting white subjects (743 boys, 672 girls) who were studied in seven North American Lipid Research Clinics, using common protocols and laboratory methodology.

Dieting and weight concerns

During adolescence, both males and females become preoccupied with and sensitive about their changing size, shape, and physical appearance. This is part of normal adolescent development. In our culture, with emphasis on thinness for females and a muscular build for males, body dissatisfaction for both sexes becomes inevitable. Weight concerns and food restrictions have become so pervasive among young females that they are considered normative. The frequency of dieting and maladaptive eating behaviors among adolescent females is alarming. Results of the National Adolescent Student Health Survey,[37] which surveyed more than 11,000 8th and 10th graders nationwide in 1988, showed that 61 percent of adolescent females reported having dieted during the past year (as compared to 28 percent of males). Many adolescents were using unhealthy methods to try to lose weight. Of the students who dieted half (51 percent) reported that they fasted to control their weight; 16 percent said they used diet pills; 12 percent induced vomiting; and 8 percent used laxatives to control their weight. Another recent large survey[17] found that 31 percent of teenage females and 13 percent of teenage males binge eat. Thirteen percent of the adolescent females were chronic dieters, having been on 10 or more diets over the past year (as compared to 2 percent of the males). Only 25 percent of females were satisfied with their current weight and proud of their bodies, as compared to 49 percent of males. Weight concerns and dieting practices are now occurring with greater frequency among older children and young teenagers. A recent study[38] found that 45 percent of 8- to 13-year-old boys and girls wanted to be thinner and 37 percent had already tried to lose weight.

Fear of fatness and disordered eating behaviors occur regardless of weight status. Feldman et al. found that almost half of teenage girls thought they were too fat, although only 17 percent were actually overweight.[39] Worrying about weight and feeling conflictual and guilty about food and eating are almost constant issues in the lives of many teenage girls.[40, 41] The cultural pressure to be thin and societal views which stress the desirability of a lean, lithe body, particularly among youth, place a great burden on young women and leads to inappropriate eating behaviors. Teenagers at highest risk for being weight conscious are those in families where there is a history of chronic dieting or of an eating disorder and where there is a high value placed on physical attractiveness and thinness.[42] Also, adolescents involved in activities where weight or shape is important, such as modeling, gymnastics, wrestling, cheerleading, ballet dancing, and long-distance running, are at risk for potentially harmful weight-related behaviors.[42] The consequences of chronic food restriction that leads to inadequate energy intake can be severe, resulting in poor growth, delayed sexual development, and nutritional dwarfing.[43–46] Pugliese, et al.[45] found that of 503 adolescent females studied, 25 percent were less than 90 percent of their ideal body weight-for-height, and 1.8 percent exhibited linear growth retardation associated with poor weight gain.[45] In another study by the same research team, deteriorating linear growth and nutritional dwarfing occurred in adolescents who did not meet the diagnostic criteria for anorexia nervosa, but who did have a fear of obesity.[43] In addition to nutritional dwarfing, binging and purging behaviors and excessive dieting may lead to other medical complications.[47, 48] Binge eating can cause acute gastric dilatation. Self-induced vomiting can cause electrolyte imbalances, cardiac arrhythmias, enlarged parotid glands, esophageal inflammation, and dental enamel erosion. Laxative abuse can lead to electrolyte abnormalities, dehydration, metabolic changes, and gastrointestinal complications.

Disordered eating and weight-related eating behaviors should be viewed as a continuum, progressing from benign short-term experimenters or occasional dieters to the clinical extremes of anorexia nervosa and bulimia nervosa.[42] Dieting, inappropriate eating, body dissatisfaction, and distorted attitudes toward food are best understood as women's responses to the cultural emphasis on slimness and low body weight.[49] While these attitudes and behaviors are pervasive among adolescent females, the classic eating disorders of anorexia nervosa and bulimia nervosa occur at a much lower rate.

Eating disorders: Anorexia nervosa and bulimia nervosa

Anorexia nervosa and bulimia nervosa are eating disorders of great public health concern due to their frequency and the seriousness of their psychological and medical consequences. If untreated, eating disorders can lead to considerable morbidity and mortality. Recent reports suggest a mortality rate between 2 and 8 percent.[50] While anorexia nervosa and bulimia nervosa are distinct disorders, they share many common and overlapping features.

Anorexia nervosa is a syndrome of self-induced starvation characterized by a voluntary refusal to eat due to an intense fear of becoming obese, and by extreme weight loss, amenorrhea, and body image disturbances. Anorexia nervosa is not a homogeneous disorder; subtypes exist such as restrictive anorectics and those who have bulimic episodes, often followed by vomiting. Many of these individuals also have bulimia nervosa.

Bulimia nervosa is a disorder distinct from anorexia nervosa and is characterized by recurrent episodes of binge eating; a feeling of lack of control over eating behavior during the eating binges; use of self-induced vomiting, laxatives, diuretics, dieting, or vigorous exercise in order to prevent weight gain; and persistent overconcern with body shape and weight. To meet the diagnostic criteria, the person must have had a minimum of two binge eating episodes a week on average for at least three months. While rapid consumption of large amounts of food in a short period of time (the symptom of bulimia) is present in about one half of anorexia nervosa patients, bulimia is different from anorexia nervosa in that the diagnosis of bulimia does not require a specific amount of weight loss (as does the diagnosis of anorexia nervosa). Bulimia nervosa can exist at any weight level, ranging from underweight to overweight. The majority of bulimics are within a normal weight range, although many have had a history of weight disturbances, with 30–80 percent having a history of anorexia nervosa.[51] Anorexia nervosa and bulimia nervosa can be diagnosed in a standard form using the criteria in the revised third *Diagnostic and Statistical Manual* (DSM III-R) of the American Psychiatric Association.

Studies have indicated that the incidence of eating disorders has increased dramatically over the past two decades.[50, 52] It is unclear, however, whether this represents an actual increase in the incidence or simply an increase in awareness and diagnosis. Most surveys establish the prevalence of anorexia at about one case in 100 adolescent girls.[53] There are no well-conducted epidemiological studies of bulimia. Bulimia does, however, appear to be more prevalent than anorexia nervosa.[53] Prevalence estimates based largely on research with samples of high school and college females range from 3 to 19 percent depending on the choice of diagnostic criteria.[47] Studies employing very stringent criteria indicate that the prevalence rate for bulimia nervosa in college women is between 1 and 2 percent.[54] While the *symptom* of bulimia (gross overeating) is common among adolescents and young adults of both sexes, the *syndrome* of bulimia has a much lower prevalence rate. Approximately 90 to 95 percent of the anorectic and bulimic population is female. The greater incidence in females may be related to the intense societal pressure on females to be thin. Eating disorders occur more frequently in white females from middle to upper-middle class families.[47] Eating disorders occurring in ethnic minorities have been reported and are usually associated with upward mobility and a move away from cultural values which associate extra weight with comfort.[53] The most common age of onset for eating disorders is the teenage years. Eighty-five percent of individuals who develop anorexia nervosa are between the ages of 13 and 20, with the bimodal age of onset at 13 to 14 and 17 to 18 years. Bulimia generally occurs later, at an average of 17 to 18 years of age.

The etiologies of both anorexia nervosa and bulimia nervosa are unknown. Proposed explanations have included neurochemical abnormalities, familial factors, and psychosocial and cultural influences. The weight of the evidence supports a biopsychosocial model, with an interplay of forces within the individual, family, and culture. The specific interaction between the factors is not known. Garfinkel and Garner proposed that many people possess the individual, family, and cultural antecedents of eating disorders, and that these become pathogenic due to stressors which initiate dieting, weight loss, and pursuit of thinness.[55]

In the area of eating disorders, many questions are left unanswered. Much work remains in clarifying the epidemiology of eating disorders and in identifying etiological factors and effective treatments. At this time, means to prevent eating disorders are unknown. Clearly, more work is needed in this area.

Nutrition issues and adolescent pregnancy

Each year, one in 10 teenagers aged 15–19 becomes pregnant in the United States. In 1985, 1,031,000 teenagers became pregnant with 477,710 giving birth.[4] Of these births, nearly 10,000 were to females under the age of 15. Pregnancy places adolescent females, who are already at risk for nutrition problems, at even greater risk because of the increased energy and nutrient demands of pregnancy. While data on nutrient requirements of pregnant teenagers are extremely limited, in general, the greater the amount of uncompleted growth at conception, the greater the energy and nutrient needs of the adolescent. The majority of growth occurs prior to menarche. Almost all residual growth occurs in the first two years after menarche. Gynecologic age (GA), the difference between chronologic age and age at menarche, can be used as an indirect measure of physiologic immaturity and growth potential. A pregnant teenager with a GA of two years or less may well be in a period of appreciable growth and thus will have increased nutrient requirements as compared to adolescents who have finished their growth.

An adolescent's nutrition and weight status and life-style patterns at conception and during gestation profoundly influence pregnancy outcome. Many disadvantaged adolescents have chronically poor dietary habits and may enter their pregnancies in marginal nutrition condition.[16] While relatively little is known about the relationship between inadequate diets or mild nutrient deficiencies in pregnant adolescents and neonatal outcome, the association between inadequate energy intake (i.e., poor weight gain) and pregnancy outcome is much clearer. Low prepregnancy weight status and low weight gain during pregnancy, particularly in combination, are known to be strong determinants of low birthweight.[2, 16] This may be particularly significant in the young adolescent, as studies have shown that a young adolescent with a pregnancy weight gain and prepregnancy weight similar to that of an older woman may have a smaller newborn. At this time, due to lack of research data, optimal weight gain patterns for pregnant adolescents are not known. However, the Institute of Medicine's recent report on *Nutrition During Pregnancy* recommends that young adolescents (i.e., those within two years of menarche) have weight gains toward the upper end of the recommended weight ranges for pregnant women (see chapter 3, Women's Nutrition During the Reproductive Years).

Inadequate nutrition is a modifiable risk factor, and intervention programs to improve nutritional health and promote adequate weight gain among pregnant adolescents are needed. Research is also needed to improve understanding of the relationship between nutrition and neonatal outcome in young adolescents, and of independent and/or additive effects among nutrition and other modifiable maternal risk factors (such as substance use and genital infection).

Because of the importance of nutrition in the course and outcome of pregnancy, all pregnant adolescents should have a formal assessment of their nutrition status at the beginning of their prenatal care, with ongoing monitoring and counseling throughout pregnancy.

Nutrition and sports

Over seven million high school students are involved in high school sports. In addition, an estimated 20 million males and females between the ages of 8 and 16 are involved in nonschool community-sponsored athletic programs, and another 20 million adolescents participate in unstructured recreational activities.[56] Because adolescents are developmentally in a phase of exploration and experimentation, they are easily attracted to nutrition products, erogenic dietary aids, and nutrition advice that promises a winning performance and/or rapid changes in body shape.[57] It is well established that good nutrition is essential for optimal performance of athletic activities.[58] In the highly competitive world of sports, it is easy for the teenage athlete, the coach, the trainer and/or the parent to become vulnerable to nutrition misinformation or food faddism. Misconceptions about nutrition are common, especially in the area of nutrient supplements, weight control, or training diets. There is no scientific foundation to support anecdotal claims that nutritional erogenic aids (e.g., brewer's yeast, bee pollen, wheat germ), vitamins and minerals, or a large intake of protein will enhance physical performance. Benefits appear to be psychological rather than physiological. While many of these practices (e.g., taking brewer's yeast or a multivitamin supplement at RDA levels) may be harmless, when these practices replace a sound nutrition program and a nutritionally well-balanced diet, health and performance may be affected, resulting in serious consequences.

Many young athletes may want to improve their sports performance by increasing their body weight. Athletes who may wish to gain weight are football players and others in contact sports, weightlifters, heavyweight wrestlers, and long-distance cold water swimmers.

Athletes eating a large amount of food will almost certainly consume adequate levels of protein, vitamins, and minerals. Protein and/or vitamin supplements do not have added nutrition benefit and are expensive. Athletes trying to gain weight often turn to high-protein foods (beef, eggs, dairy products, desserts) that are also high in fat, particularly saturated fat and cholesterol. The result is a diet with athrogenic potential.[57] Adolescents should be counseled regarding ways to increase their energy intake without increasing saturated fat and cholesterol in their diets.

For many sports, such as gymnastics, ballet, wrestling, and long-distance running, the competitive edge is a low body weight. This often results in excessive dieting, reliance on unhealthy methods to lose weight, and preoccupation with food and fatness, and, in some cases, extreme weight loss. Severely limiting food intake, restricting fluids, or purging in order to weigh less than the weight limit are common techniques.[57, 59] The short-term effects of these practices include chronic fatigue, hypoglycemia, and an increased incidence of illness and heat injury. The long-term effects of these practices on the growing athlete are not clear, but amenorrhea, impaired skeletal health, and loss of potential stature are areas of concern.[59] Individuals in sports that emphasize a lean physique or low percent body fat are at risk for undernutrition and, in females, for developing eating disorders.[59]

Another nutrition-related concern in athletes is iron deficiency, which may occur in males undergoing rapid growth but occurs more commonly in female athletes. Nonanemic iron deficiency with decreased iron stores has been observed in 20 to 40 percent of female high school cross-country runners during the training season.[60] This iron deficiency has been defined as one with normal hemoglobin values, serum ferritin levels below 12 mg/ml, and transferrin saturation below 16 percent. The cause of hypoferritinemia in female athletes is unclear, but contributing factors may include inadequate dietary intake, increased erythrocyte destruction, decreased iron absorption, increased gastrointestinal blood loss, and menses.[60, 61] Whether iron deficiency without anemia decreases performance is controversial. A recent study showed decreased endurance times in cross-country runners with decreased iron stores, indicating that iron deficiency is detrimental to performance during sustained exercise even before the onset of anemia.[61] It is recommended that female distance runners be tested for evidence of iron deficiency or iron deficiency anemia by hemoglobin and serum ferritin determination.[60, 61]

Given the level of nutrition misinformation, the increased nutrient needs of active adolescents, and the beneficial relationship between good nutrition and performance, there is a widespread need for nutrition education for coaches, trainers, adolescents, and health professionals working with youth and parents. Adolescents involved in sports or related activities are usually highly motivated and receptive to learning and practicing good nutrition. The nutrition guidelines should be appropriate for the type of body composition required by the sport or activity, for the type of physical performance required, and for optimal short-term and long-term health.

Dental caries

Significant progress has been made in improving the oral health status of many children in the United States.[62] From 1971 to 1987, there was a continuing decline in the prevalence of dental caries. The decline has been attributed largely to fluoride in water supplies, toothpaste, and other forms. In children, the prevalence of dental caries increases with age and is much higher among adolescents than among younger children.[63, 64] The recent National Dental Research Survey found that while 56 percent of 10-year-olds were free of caries in 1987, only 22 percent of 15-year-olds were caries free.[62] A number of studies have identified higher dental caries rates and/or unmet treatment needs among American Indian, Alaskan Native, black, Hispanic, or migrant children.[63]

Diet and nutrition play an important role in causing or helping to prevent tooth decay. While fluoride is the most critical and dominant diet-related factor in dental caries prevention, sugars are considered the most important dietary factors in the causation of dental caries.[64, 65] Although the relationship between sugar and dental caries is complex, it is well established that a reduction in the frequency and quantity of consumption of sugar-rich foods in the diet will help reduce decay.[65] While epidemiological studies have shown an association between total sugar intake and tooth decay, the total amount of sugar (i.e., fermentable carbohydrates) in the diet appears to be less important than other factors such as the frequency of eating; the amount of food retained in the mouth, particularly on tooth surfaces; and the length of time that food residues are retained in critical areas.[64–66] Sticky sweet foods that adhere to the teeth are more cariogenic than those that wash off quickly. The longer cariogenic foods remain in the mouth, the more capable they are of initiating tooth decay.

Strong evidence supports the relationship between the frequency of eating or drinking cariogenic items between meals and the incidence of dental caries.[65–68] Sugary candies, baked goods, and sugar-sweetened beverages consumed between meals are considered the most critical dietary factors in dental caries causation, as sugars facilitate the action of cariogenic bacteria.[65, 66] Frequent snacking, especially on carbohydrate-rich foods, is a common practice among many adolescents, the group most prone to caries. Shaw has pointed out that the control of dental caries through dietary modifications is promising but fraught with problems.[65] This is especially difficult with youth given their snacking practices, their preference for high-sugar foods, and the availability of these foods. Diet-related interventions to reduce tooth decay will require a focus on eating regular meals and replacing high-sugar snacks with low-cariogenicity foods. This will require changes in the home, school, and community environments. Schools can play a facilitative role by not offering cariogenic foods or snacks in vending machines or school canteens; such foods and snacks are widely available in many secondary schools.[66]

Nutrition Services Required

Nutrition in health care settings

The biological and psychosocial developmental issues of adolescence are complex and interrelated. The nutrition issues during adolescence differ from those of children or adults. Knowledge of both the developmental and nutrition concerns unique to the adolescent is essential. This combination allows optimal nutrition evaluation and treatment. The availability of adolescent-oriented nutrition services in various health care settings is unknown. There are adolescent centers where all personnel, including nutritionists, are trained in adolescent issues. Other clinical areas needing adolescent nutrition counseling would include lipid research centers, weight reduction clinics, prenatal care clinics, eating disorder clinics, hospital inpatient units, as well as health care in juvenile justice facilities and rehabilitative units dealing with alcohol and drug addictions. The availability of adolescent-oriented services or expertise in these areas is unknown.

Care for adolescents in prenatal clinics is particularly important, as there is increasing evidence that adequate nutrition clearly reduces the prematurity rate and thus the number of infants weighing under 2,500 grams at birth. So whether the setting is a general prenatal clinic or a special adolescent clinic, adolescents need specific nutrition care. In large lipid centers, dietary therapy for cholesterol and saturated fat is the primary focus. Whether hypocholesterol and hypolipid diets are compatible with normal growth and development is unknown. There is already evidence that growth in some children following a hypolipidemic, hypocholesterolemic diet is retarded.[69] Particularly in adolescent inpatient units, nutrition services for special needs of hospitalized adolescents are important. The nutrition focus in hospitals is on malnutrition and therapeutic nutrition. This is particularly true for critically ill adolescents requiring prolonged enteral or parenteral alimentation. For example, teenage boys are usually sensitive to energy restriction during midpuberty. In summary, there are clinic and hospital settings where the biological, psychosocial, and developmental knowledge of adolescents is important in order for appropriate nutrition care to be delivered.

School-based nutrition education

Allensworth and Kolbe have noted that schools could perhaps do more than any other single agency in society to help young people become healthy adults and live healthier, longer, more satisfying and productive lives.[70] Nutrition education may be most appropriate and effective within a comprehensive school health program that establishes a foundation for understanding the relationship between personal behavior and health. The inclusion of nutrition education in the total school curricula has been difficult, however, because nutrition education competes for time and emphasis with basic education, critical thinking skills, and other health-related programs such as drug, tobacco, and AIDS education. In some schools, nutrition education has been integrated into other disciplines and subject areas. Regardless of where it is placed, nutrition education needs to be a part of the curricula, as it is among the life skills that all adolescents must know and practice.[71] The goal should be working towards inclusion of nutrition education as part of a comprehensive school health program in junior and senior high schools in all states.

To help school personnel and others plan, implement, and evaluate nutrition education efforts, there is a need for the development of national guidelines for school-based nutrition education. These guidelines should include the following: goals and objectives, content areas (what should be taught), effective models for the delivery of nutrition education to different groups of adolescents (e.g., early adolescence vs. late adolescence, those with special learning needs), outcome measures, and evaluation techniques. Because knowledge alone is inadequate when students must decide which foods to eat and have to deal with peer and family issues, as well as with a widely available supply of high-fat, high-sugar foods, these guidelines should address strategies for behavior change and teach skills necessary to make informed dietary decisions.

Within the school, there is also a need for enhancement of the school cafeteria as a learning laboratory for nutrition education. The messages of the cafeteria need to be consistent with those of the classroom. It is especially important that school menus incorporate the principles of the dietary guidelines and that food choices include lower-fat food items, fruits, vegetables, and whole grain products. The sale of foods of limited nutritional value throughout the day is common in many high schools and is at cross-purposes with the goals of nutrition education. Local school boards should be encouraged to restrict the sale throughout the day of low-nutrient-dense foods that are in competition with school meals.[72]

Parent and family involvement

Parents as well as teenagers should be targets for nutrition education since they are usually the gatekeepers of foods and serve as role models for eating behavior. While parents may have little control over what their teenagers are eating outside the home, they can control what is brought into the home. Teenagers tend to eat what is available and convenient. Parents can capitalize on this by stocking the kitchen with a variety of nutritious ready-to-eat foods such as fruits; juices; low-fat yogurt, cheese, and milk; nuts; raw vegetables; and whole grain breads and cereals. And they can limit the availability of high-sugar, high-fat foods within the home. More innovative use should be made of different settings and outlets to deliver nutrition education to parents, including worksites, community centers, supermarkets, restaurants and parent education programs.

Training Issues

Nutrition professionals

In recent decades in the United States, the period of adolescence has come to be recognized as a unique and distinct life stage. While it is well accepted that adolescents as a group are at risk for nutrition-related problems, public health nutritionists and dietitians have had limited formal education in the health and nutrition needs of adolescents. A recent survey of nutrition professionals working with youth found that a large proportion of practitioners perceived themselves as having inadequate skills in several major areas of adolescent health, particularly in managing special conditions that place youth at risk.[73] In 17 out of 20 categories, 25 percent or more of all practitioners reported having insufficient skills. The top five areas identified were chronic and handicapping conditions (82 percent), sports nutrition (81 percent), alcohol/drug abuse-related concerns (80 percent), eating disorders (72 percent), and family planning (66 percent). Another recent study found perceived deficits in the skills of many nutritionists involved with pregnant adolescents, primarily in the areas of communication, counseling, and applications of adolescent development theory.[74] Both studies indicated that in addition to a lack of sufficient education or training, a primary barrier identified in working with youth was limited availability of time There is a clear need for more adolescent-related training and education for nutritionists working with youth. To help ensure the availability and provision of nutrition services to youth, nutritionists need to become vocal advocates and take a responsible and prominent role in assuring that high-risk adolescents receive nutrition services and that nutrition is a recognized component in the total health care of adolescents. Such a step includes encouraging health care insurers to reimburse patients for dietary counseling and becoming advocates on policy, legislation, and service delivery to improve the nutritional health of youth. Adolescents represent our investment in the future.

Medical professionals

According to a study conducted in 1985 by the National Research Council, the nutrition education that medical students receive is still inadequate,[75] despite the long-held view that nutrition education for medical students and physicians is quite important. The survey noted that only a small number of medical schools emphasize the role of nutrition in health and preventing disease. This issue is important for adolescents who are salt-sensitive or cholesterol hyper-responders. These teenagers face a lifetime exposure to these nutrients, with potential adverse effects on their health. Nutrition habits compatible with a healthy life-style become a critical element in the knowledge base of students, house staff, and individuals specializing in adolescent health care.

The American Society for Clinical Nutrition has only recently set up guidelines for core content for nutrition in the medical school curriculum.[76] In their recommendations, priority subjects included such items as body weight, body composition, and energy balance. Also high priority are basic nutrients essential for maintaining good health. Specific clinical entities such as diet and hypertension, and diet and hyperlipidemia, were included. These topics should be modified for adolescents. There are nutrition issues specific to adolescence which are not listed in this basic curriculum and which could be added to pediatric residency programs (e.g., puberty's effect on the nutrient requirements of teenagers). In addition to medical schools, nursing schools also need to include nutrition issues of adolescents in their curricula. In many programs, when a registered dietitian is not available, nurses play a major role in providing nutrition counseling. They are also often in a key position to identify nutrition problems and potential problems.

Recommendations

The following briefly summarizes the recommendations found in the text.

Public policy

- Work is needed towards the development and implementation of surveillance and monitoring systems at the local, state, and national levels to (1) assess insufficiencies, imbalances, and excesses of nutrients and/or energy among teenagers; (2) identify dietary and other nutrition-related risk factors for disease; and (3) identify subgroups of adolescents at risk for nutrition problems.
- Improve food stamp benefits so that all poor families can purchase a nutritious and adequate diet.

Nutrition education

- Include nutrition in comprehensive health education in junior and senior high schools in all states.
- There is a need for the development of national guidelines for school-based nutrition education programs.
- More research and demonstration projects are needed on effective educational methods for teaching nutrition to adolescents.
- More innovative use should be made of different settings and outlets to deliver nutrition education to parents and adolescents (e.g., community centers, restaurants, worksites, and parent education programs).

Food services

- Provide education and training to school food service directors on strategies and techniques for incorporating the principles of the dietary guidelines into school meal programs.
- Enhance the school cafeteria as a learning lab for nutrition education.
- Provide strategies to increase school lunch participation among all teenagers.
- Expand funding base and school participation for the school breakfast program in poor areas.

- Improve eligibility and reimbursement levels for the school lunch program so that all low-income adolescents can be assured an adequate lunch.

Training

- There is a need for more training and continuing education for all health care providers in the area of nutrition in order to better meet the health care needs of youth.
- Medical, nursing, and nutrition programs should include the nutrition needs and concerns of adolescents in their training and course curricula.

Health services

- Nutrition screening and assessment should be a component of all adolescent health assessments.
- Nutrition counseling provided by qualified professionals for adolescents who have weight problems or diet-related problems should be reimbursed by health care insurers.
- Strategies for integrating nutrition screening, education, and intervention services into health services aimed at teenagers should be developed.

Research

- Research is needed in several areas. Examples of specific areas of research needs include: nutrient requirements of adolescents, particularly in relation to sexual maturity; optimal weight gain patterns for pregnant adolescents; effective education methods for changing dietary behaviors among adolescents; effective methods to promote increased physical activity in adolescents; diagnosis and assessment of adolescent obesity; and nutrition-related risk factors for adult chronic diseases.

Coordination

Proper nutrition during adolescence is important to ensure not only short-term health but also long-term health. The challenge of helping teenagers adopt healthy eating habits cannot be met effectively through the efforts of any one individual, school, or organization. Rather, it will require the coordinated efforts of parents, teenagers, educators, health professionals, communities, the food industry, and policymakers, all working together to motivate and enable young people to choose healthy foods and to create more opportunities and support structures for healthful eating.

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Children with Special Health Care Needs

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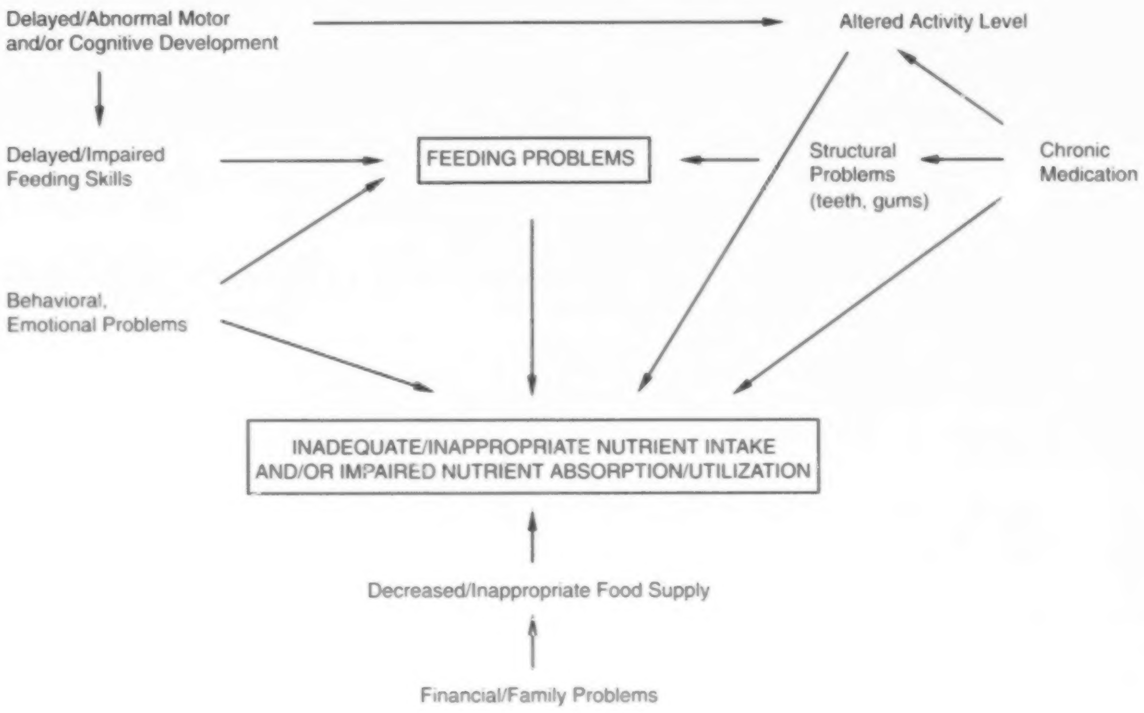
Children with special health care needs make up approximately 10–15 percent of the pediatric population. The term *special health care needs* describes a group of infants, children, and youth with, or at risk for, physical or developmental disability, or with a chronic medical condition caused by or associated with genetic/metabolic disorders, birth defects, prematurity, trauma, or infection (including human immunodeficiency virus [HIV] infection).[1] In addition, a new population of children who are perinatally exposed to drugs is emerging in importance. These children may be mentally retarded and/or may have serious emotional/behavioral disorders. Although the diagnoses are varied, there are common elements related to the care of these children which typically represent hardships for their families.[2] The conditions often require extended periods of care and intermittent hospitalization. Although the need for health care varies, costly specialized services provided by many disciplines often are necessary for the optimal care of these children. This can place a financial burden on families and otherwise cause significant disruption of family life. This is especially true of families lacking access to tertiary care centers which support multidisciplinary teams or to schools with limited resources to provide special education.

Needs

The nutrition concerns of children with special health care needs vary from being critical (e.g., the child with a metabolic disorder controllable only by diet) to being similar to those of other children. In fact, the special child in the family is first of all a child with the same nutrient needs for optimal health, growth, and development as his or her siblings. Superimposed on these needs, however, are often multiple risk factors, represented schematically in figure 7.1. They range from social/environmental factors, such as decreased access to food because of limited finances, to more disorder-related factors, such as feeding problems or the need for chronic medication. Such factors may place a child at risk for inadequate nutrient intake, impaired nutrient absorption or utilization, or increased nutrient excretion. Such insults, if they are severe and/or prolonged, and especially if they occur early in life, can have lasting effects on the child's growth and cognitive development.[3]

The developmental needs of children with special health care needs may differ substantially from those of other children. Infants born prematurely, or with birth defects which require prolonged hospitalization and/or medical intervention, "miss out" on important developmental stimuli. Developmentally delayed children may need to be coached through their developmental milestones, including feeding milestones, by caregivers who themselves may need coaching in the recognition of readiness cues. Most of these children can benefit from stimulation provided by early intervention, which is now being encouraged by legislation (P.L. 99-457, The Education of the Handicapped Act Amendments of 1986). Nutritionists, as part of early intervention teams, contribute by assuring that nutrition needs are being met as reflected in adequate dietary intake,

Figure 7.1: Nutritional risk factors in children with special health care needs


Delayed/Abnormal Motor and/or Cognitive Development
Altered Activity Level
Delayed/Impaired Feeding Skills
FEEDING PROBLEMS
Structural Problems (teeth, gums)
Chronic Medication
Behavioral, Emotional Problems
INADEQUATE/INAPPROPRIATE NUTRIENT INTAKE AND/OR IMPAIRED NUTRIENT ABSORPTION/UTILIZATION
Decreased/Inappropriate Food Supply
Financial/Family Problems

appropriate height and weight, and appropriate feeding techniques/procedures.[4]

Children with special health care needs come from families representing all ethnic and racial groups. Economically, the population distribution is skewed toward poor families who are at increased risk because of environmental hazards, lifestyle characteristics, and reduced access to health care, especially preventive health care such as early prenatal services.

The emotional needs of children with special health care needs and their families are magnified by the process of adjusting to a chronic condition. Families typically go through a period of grieving following the birth or diagnosis of the child with special health care needs. This is often complicated by feelings of guilt. Divorce is common in such families, where the daily stresses of life are multiplied by those related to managing the needs/problems of their special child. As the child grows older, he or she may suffer from depression at the realization of his or her "differences" and/or "limitations." Interactions with health or education professionals may either escalate or mitigate the social and emotional problems of the family, depending on whether the team is responsive to and respects the individual family's values, culture, life-style, and resources, as well as its desires and needs.

Special Risk Conditions

The prevalence of chronic conditions in the U.S. population and their associated nutrition problems are presented in figure 7.2. The following examples of specific chronic illness or disabilities illustrate the

Figure 7.2: Prevalence of certain chronic conditions with associated nutrition-related problems

Adapted from: Dwyer, J. T., and Freedland, J. (1988). Nutrition services. In H.M. Wallace, G. Ryan, Jr., and A. Oglesby (Eds.), *Maternal and child health practices* (3rd ed.). Oakland, CA: Third Party Publishing Co.

DISORDER	PREVALENCE ESTIMATES PER 1,000 (AND RANGE)	EXAMPLE OF NUTRITION PROBLEMS AND FACTORS CONTRIBUTING TO HIGH NUTRITIONAL RISK													
		Child-related										Caregiver-related			
		Altered nutrient needs	Altered energy needs/intake	Problems with oral cavity	Nutrient deficiencies	Constipation/diarrhea	Poor appetite	Delayed feeding skills	Malabsorption	Nutrient-drug interactions	Maladaptive behaviors	Lack of knowledge	Difficulty understanding diet	Does not limit intake	Inappropriate feeding practices
Asthma	38 (20–53)		●		●		●			●					
Moderate to Severe	10 (8–15)														
Visual Impairment	30 (20–35)							●			●				
Impaired Visual Acuity	20														
Blind	0.6 (0.5–1)														
Mental Retardation	25 (20–30)		●	●		●		●			●				●
Hearing Impairment	16														
Deafness	0.1 (0.6–1.5)														
Congenital Heart Disease	7 (2–7)	●	●		●		●		●	●		●			
Severe Congenital Disease	0.5														
Seizure Disorder	3.5 (2.6–4.6)	●								●		●			
Cerebral Palsy	2.5 (1.4–5.1)		●	●	●	●	●	●		●		●		●	●
Arthritis	2.2 (1–3)	●	●									●			
Paralysis	2.1 (2–2.3)		●			●		●			●	●		●	
Diabetes Mellitus	1.8 (1.2–2.0)											●	●	●	
Cleft Lip/Palate	1.5 (1.3–2.0)		●	●				●				●			●
Down Syndrome	1.1		●	●		●		●			●	●		●	●
Sickle Cell Disease	<1.0	●			●										
Neural Tube Defect	<1.0		●			●				●				●	
Autism	<1.0						●			●	●				●
Cystic Fibrosis	<1.0	●	●		●	●	●		●	●		●	●	●	●
Hemophilia	<1.0														
Acute Lymphocytic Leukemia	<1.0	●	●		●	●	●			●					
Phenylketonuria	<1.0	●			●							●	●	●	
Chronic Renal Failure	<1.0	●	●		●	●	●			●		●	●		
Bronchopulmonary Dysplasia		●	●		●			●		●					
AIDS		●	●	●	●	●	●	●	●	●		●			
Gastrointestinal Disorders		●			●	●	●		●						

nutrition concerns common to children with special health care needs.

Diseases with direct metabolic or nutritional effects

This group of diseases has a direct relationship to nutrition status because of abnormal metabolic patterns or gastrointestinal anomalies which affect absorption. Some inborn errors of metabolism, such as phenylketonuria (PKU), can be treated by specific diets which, if instituted promptly, can prevent or attenuate serious organ damage and mental retardation. It has become clear with PKU that continued treatment in older children is associated with higher intellectual function.[5] In addition, the children and youth who continuously follow the PKU dietary recommendations have fewer behavioral problems, and, in females, a better chance of successful pregnancy outcome. The dietary modifications are therefore typically lifelong. Other metabolic diseases responsive to dietary treatment, such as maple syrup urine disease, although rarer, are generally even more difficult to manage. They often require close, sometimes daily, support for the child and family.[6] Since almost all of the intervention occurs at home, the parents and teachers must be important members of the health care team. For this reason, their education is a paramount feature of the program.

In some conditions, such as cystic fibrosis, there is an associated element of malabsorption which requires dietary supervision to promote growth and avoid specific deficiencies. In addition, children with cystic fibrosis have frequent infections, often pulmonary, that not only affect appetite, but may have associated vomiting and fever, which further increase nutrient need. While it is not a life-limiting aspect of this disease, diet management plays a significant role in the overall well-being of the child. Aggressive nutrition management can result in appropriate weight gain and sustained catch-up growth, and have a positive effect on lung function.[7]

In recent years, infants have survived major gastrointestinal resections for such diseases as necrotizing enterocolitis because of the availability of parenteral nutrition. Some of these children have such limited residual gut that they are committed to long-term total parenteral nutrition (TPN). Other severe gastrointestinal disorders, such as inflammatory bowel disease and intractable diarrhea, place children at high risk for anorexia, growth failure, and several vitamin and mineral deficiencies.[8] Any prolonged insult involving decreased or interrupted nutrient intake can have long-term effects on both physical and cognitive development. The number of children whose medical problems necessitate extraoral feeding, by either nasogastric or gastrostomy tube, or by TPN, is increasing dramatically at the present time. These children require frequent and often intensive follow-up care in order to biochemically monitor nutrient (particularly trace nutrient) intake, as well as growth parameters.

Congenital anomalies

There are a variety of congenital anomalies which have nutrition implications. In some cases, the anomalies affect the structure or function of the gastrointestinal tract in such a way as to require special feeding approaches. Structural abnormalities, such as the Pierre-Robin sequence and cleft lip and palate, require physical modifications of the feeding process. The abnormalities associated with achalasia (sphincter dysfunction) also require modification of the feeding process.

Children with spina bifida require careful assessment of associated abnormalities because the presence and extent of other clinical features, such as the child's ambulatory status or the need for chronic medications, will determine the nature and severity of anticipated nutrition problems. Congenital skeletal anomalies or neuromuscular diseases may also indirectly affect nutrition status by the associated reduction of the child's lean body mass and activity level.

Congenital heart disease poses a broad range of problems. The infant with decreased cardiac function may find feeding difficult because of the extra work load, which, in turn, increases energy needs. High-calorie, low-sodium diets may be necessary for some.

Other chronic illnesses

Organ failure due to a variety of causes and of a variety of forms requires particular nutrition planning. The special dietary needs for individuals with chronic hepatitis or cerebrosis exemplify the challenge of providing adequate nutrients for growth while limiting the excessive accumulation of metabolic end products. Children with renal disease exhibit growth failure secondary to altered appetite and taste in addition to the multiple metabolic abnormalities caused by limited renal excretory and regulatory capacity. Multiple dietary modifications may be required (e.g., sodium, fluid, potassium, phosphorous, and protein).

Chronic hematologic disorders such as sickle cell disease are associated with growth retardation, although the role of nutrition has not yet been well defined.[9] Hemophiliacs need nutrition counseling because the possibility of obesity related to decreased activity patterns places them at risk for accelerated joint damage.

Growth failure is also a common and significant problem for children with bronchopulmonary dysplasia (BPD).[10] Mechanisms which have been suggested to explain this phenomenon include increased energy needs due to an elevated metabolic rate coupled with intolerance to increased fluid intake and complicated by anorexia.[11] In addition, the children may exhibit reflux or vomiting and irritable behaviors that later result in severe feeding problems.[12]

Children with cancer have an almost predictable set of nutrition problems. The disease and associated treatments frequently increase nutrient requirements while also causing anorexia, nausea, and vomiting; therefore, weight loss is common. Children who have irradiation therapy to the head and neck area may eat even less because of mucositis, which may last for several weeks. At times, the difficulties in oral feeding necessitates the placement of a gastrostomy or the use of parenteral nutrition. There is surprisingly little documentation, however, regarding the contribution of nutrition support to therapy outcome or the general sense of well-being of the patient.

Children with HIV infection are at very high nutrition risk.[13] They commonly present with growth failure due to anorexia, malabsorption, chronic diarrhea, and increased urinary nutrient losses caused both by the disease and the medications used to treat it. Candida or herpes infections of the oral area and esophagus make eating painful; enlarged spleens and livers crowd the stomach. Calorie- and protein-dense feedings, vitamin/mineral supplementation, and possible tube feedings may be required in order to improve both the quality and length of life.[14] In addition, care must be taken to protect immune-suppressed children from bacteria in food.

Developmental disabilities

Children with developmental disabilities form the largest population with chronic conditions requiring nutrition intervention, and present a complex and variable set of problems.[15-21] In all cases, a careful assessment, including assessment of the developmental level, is needed to set appropriate goals, and early involvement of the parents is essential. Children with cerebral palsy represent a special challenge because oral-motor function and self-feeding skills may be affected regardless of the child's developmental level.[22] Chronic medication, especially in those with associated seizure disorder, may affect nutrient needs, as does the child's ambulatory status.

High-risk infants and toddlers (0–3 years)

Many high-risk infants have a low birthweight, which is itself a risk factor for many disabilities. The ability of these infants to catch up in terms of growth and development depends, in part, on their subsequent nutrition status. Postnatal conditions which reduce nutrient intake or utilization or increase nutrient need or excretion include mechanical feeding problems, reflux, vomiting, allergies/intolerance, and diarrhea, as well as behavioral problems which include food refusal. There are also factors associated with the families such as reduced food availability or cultural food habits which are incompatible with optimal nutrition status. Although the nutrition problems of these children may not be as serious or obvious as those with the other targeted disorders, the importance of optimal nutrition early in life cannot be overstated. With iron deficiency alone, infants show decreased scores on standardized developmental tests.[23] These deficits can still be measured in school-age children.[3] It is clear that careful nutrition screening and monitoring of high-risk infants, as a component of early intervention services, is essential.[4]

Nutrition Concerns in Children with Special Health Care Needs

Although in some instances advancing technology has facilitated the task of providing adequate nutrition to children with special health care needs (e.g., more specialized and complete formulas), the diversity and complexity of today's therapeutic modalities have also broadened and complicated nutrition management such that each diet requires individualization and monitoring.[24] Not only must diets be adjusted to each change in therapeutic approach, but they must also meet the emotional and functional needs of the child.[25]

Growth retardation

Growth retardation is associated with many chronic illnesses and developmental disabilities. Since growth retardation may also be a sign of poor nutrition status, it is a challenge for the physician and nutritionist to assess the relative role of nutrition in the etiology of failure to thrive in children with special health care needs. Following is a list of factors, referenced more completely elsewhere,[15] which must be considered:

1. Defect of a major organ system (e.g., cardiac, renal, or gastrointestinal) leading to secondary malnutrition;
2. Prenatal infections such as rubella, syphilis, or cytomegalovirus;
3. Chromosomal defects such as trisomy 21;
4. Endocrine disorders such as thyroid or pituitary;
5. Metabolic disorders affecting proteins, amino acids, carbohydrates, lipids, and vitamins or minerals;
6. Recognizable syndromes such as Treacher-Collins;
7. Specific central nervous system lesions affecting neurophysiologic growth-regulating mechanisms of the brain;
8. Neuromuscular pathology affecting growth through lack of normal ambulation or dependence in feeding;
9. Prematurity and other factors related to the neonatal course; and
10. Psychosocial deprivation.

Altered nutrient requirements

Energy. Energy needs may be increased or decreased because of a child's disorder. Examples of increased needs are cases of pulmonary dysfunction such as cystic fibrosis[7] or bronchopulmonary dysplasia,[11] where the increased work of breathing raises the child's energy needs. The motor dysfunction in children with cerebral palsy may also result in extra muscular work. On the other hand, some children with cerebral palsy may have decreased energy needs due to inactivity or lack of ambulation. Similarly, children with spina bifida have energy needs which may be altered in either direction for similar reasons. An additional factor to consider in determining energy needs is the child's lean body mass. It is typically decreased in inactive and nonambulatory children, resulting in a lower basal metabolic rate. This makes evaluating body composition an important component of the assessment of energy needs.

Individual nutrients. There are few indications to date that children with special health care needs have different nutrient requirements than do normal children, with the obvious exception of the metabolic disorders. It is possible that children with other genetic or chromosomal disorders have altered nutrient needs due to the altered genetic material. Some have hypothesized, for example, that children with Down syndrome have an increased need for certain nutrients (e.g., pyridoxine, vitamin A, and zinc) secondary to inefficient or altered metabolic pathways. These studies have recently been reviewed elsewhere.[26] Further work remains to be done. For other children, nutrient needs may be altered secondary to metabolic changes caused by the disease process (e.g., renal failure), to increases in energy needs since certain nutrient requirements are based on energy intake, or to medication required to control the disorder.

Drug-nutrient interactions. Children with special health care needs often require chronic medication due to seizure disorders, attention deficits or other behavioral disorders, risk of recurring respiratory or urinary tract infections, or chronic constipation. The effects of these and other medications on nutrition status have not been studied exhaustively. It is clear, however, that the long-term use of anticonvulsants affects the metabolism of calcium and vitamin D. Reports exist, which have been reviewed elsewhere,[21] of effects on riboflavin, vitamin B_6, vitamin E, folate, biotin, and iron status as well. Similarly, anti-infectives, stimulant or depressant drugs, and laxatives may affect the child's nutrition status either directly or indirectly (e.g., by affecting appetite). It becomes important, therefore, to consider medication usage in making an assessment.

Feeding problems. Feeding problems, with multiple etiologies, are common in children with special health care needs. The problem may be a structural defect and/or neuromuscular dysfunction which affects the child's ability to suck or swallow as an infant, or, later, to chew and to self-feed. Children who are developmentally delayed may not progress normally in reaching the milestones leading to independence in feeding even when they have no physical/medical problems, or when those problems have been resolved. This may be due to interruptions in the process, such as long-term tube feeding, or to infantilization—prolonged and inappropriate use of infant feeding techniques or foods—on the part of unwitting caregivers. The resulting behavioral problems, such as refusal to drink from a cup, pickiness with regard to food variety or texture, or self-induced vomiting, can lead to nutrient inadequacy or failure to thrive, and can cause serious disruption in the daily life of the child's family.

Nutrition Services Required

Nutrition services for children with special health care needs are in a state of evolution.[25, 27–32] New legislation, a changing population of children, home health care, high technology treatment, multiagency involvement, and the focus on family-centered, community-based delivery of services have now resulted in new opportunities for improving nutrition care.[32] In addition, parents are being more widely recognized as their child's case manager and advocate. All of these positive changes can present new opportunities for providing nutrition services in the context of comprehensive health care.

The family has the ultimate responsibility for managing the health, social, developmental, and emotional needs of the child. The delivery systems must promote the family's involvement as decision-makers, caregivers, and advocates. Nutrition and feeding have traditionally been areas where the family felt some level of involvement and confidence. In response to more complex health needs and changing technology, however, new ways to increase nutrition services while broadening the family's base of knowledge and skills must be found. Nutrition professionals need to be certain they are supporting the family and not supplanting their role. The emotional aspects of feeding are diverse, and recognition of the family's involvement is critical, as is the recognition that nutrition is only one of the myriad of concerns facing the family of a child with special health care needs. Inherent in each situation, then, is the need for all health professionals to interact with the family as a team, communicating and working toward common goals.

Owen and Frankle identify five major elements for delivering quality nutrition services: assessment, intervention, referral, monitoring, and evaluation.[33] These elements can be applied either to direct service delivery or to program development. Advocacy should be added to this list as another element which is particularly important for this population. A schematic way of looking at nutrition services, for both direct care and program management aspects, is illustrated in figure 7.3.

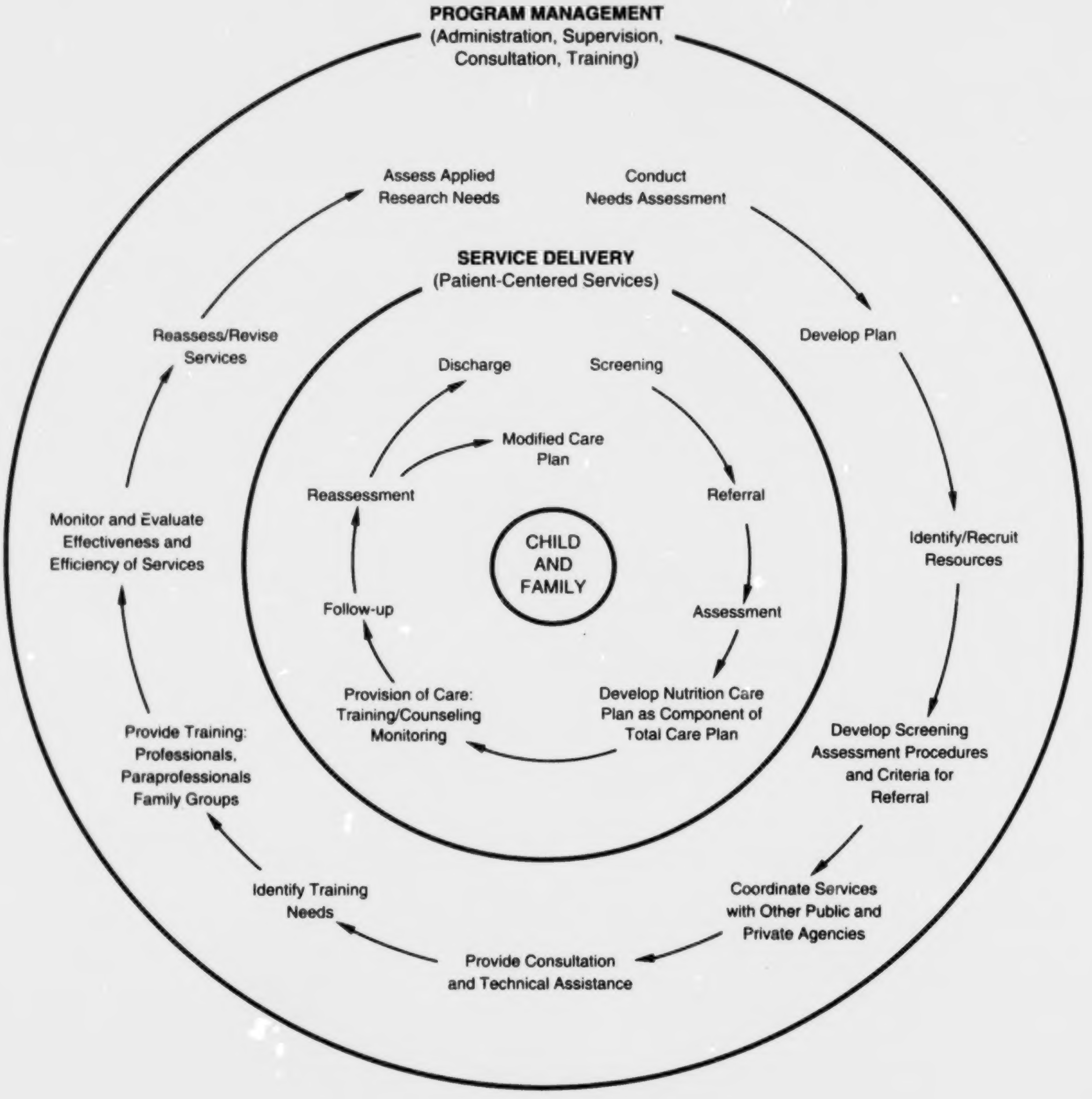
Assessment

Assessment should be performed by a nutrition professional with input from other disciplines. The list of persons who can contribute essentially represents the entire spectrum of health, education, and social service professionals. Wodarski[20] has represented this graphically, as shown in figure 7.4. Nutrition assessment of the child is described in chapter 4, "Infant Nutrition," and chapter 5, "Child Nutrition." Here, we highlight some of the important considerations in the assessment of children with special health care needs.

Anthropometry. Perhaps the most important part of the clinical assessment is the anthropometrics, because growth is the most important indicator of the child's nutrition status. Proper equipment, technique, accuracy, and appropriate reference data are the necessary components. Population-specific growth charts are available for certain syndromes where there is a clear deviation from the norm (e.g., Down, Turner, and others) and can be useful in evaluating linear growth and rate of weight gain.[34] For other children whose height or weight fall below the 5th percentile on National Center for Health Statistics (NCHS) charts, the use of Z-scores is advisable as a way of monitoring the child's deviation from the median over time. Regardless of the child's attained stature, unless there are specific indications to the contrary, his or her growth rate should approximate that of the reference population.

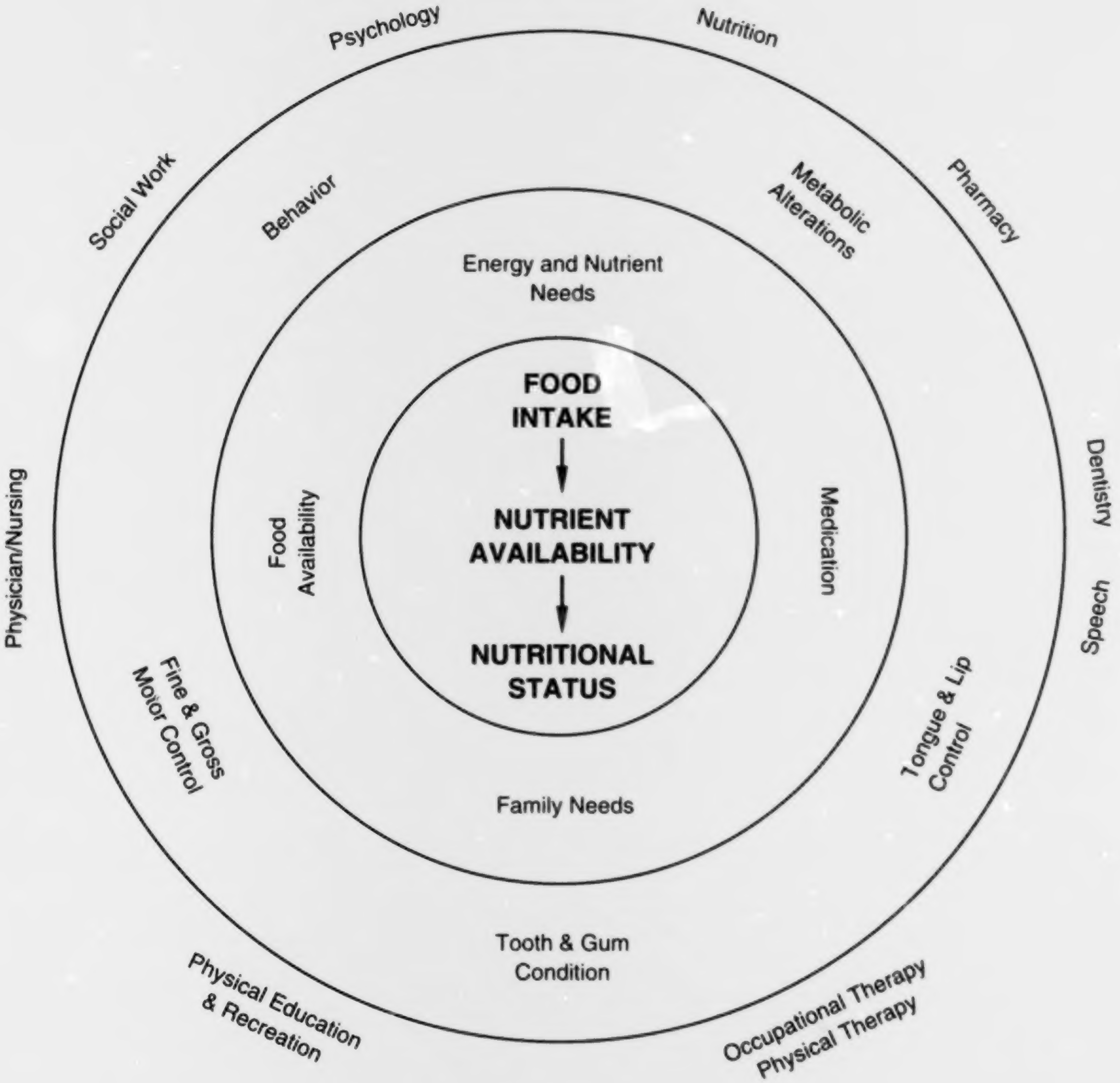
Measurement of body composition is especially important in this population

Figure 7.3: System for nutrition services


PROGRAM MANAGEMENT
(Administration, Supervision, Consultation, Training)
Assess Applied Research Needs
Conduct Needs Assessment
Develop Plan
Identify/Recruit Resources
Develop Screening Assessment Procedures and Criteria for Referral
Coordinate Services with Other Public and Private Agencies
Provide Consultation and Technical Assistance
Identify Training Needs
Provide Training: Professionals, Paraprofessionals Family Groups
Monitor and Evaluate Effectiveness and Efficiency of Services
Reassess/Revise Services
SERVICE DELIVERY
(Patient-Centered Services)
Screening
Referral
Assessment
Develop Nutrition Care Plan as Component of Total Care Plan
Provision of Care: Training/Counseling Monitoring
Follow-up
Reassessment
Modified Care Plan
Discharge
CHILD AND FAMILY

Adapted from: Baer, M. T. (Ed.). (1982). *Nutrition services for children with handicaps: A manual for state Title V programs.* Los Angeles: University Affiliated Program, Center for Child Development and Developmental Disorders.

Figure 7.4: Interdisciplinary service model


Psychology
Nutrition
Social Work
Behavior
Metabolic Alterations
Pharmacy
Energy and Nutrient Needs
FOOD INTAKE
Physician/Nursing
Food Availability
NUTRIENT AVAILABILITY
Medication
Dentistry
Speech
NUTRITIONAL STATUS
Fine & Gross Motor Control
Tongue & Lip Control
Family Needs
Tooth & Gum Condition
Physical Education & Recreation
Occupational Therapy
Physical Therapy

Adapted from: Wodarski, L. A. (1985). Nutrition intervention in developmental disabilities: An interdisciplinary approach. Copyright The American Dietetic Association. Reprinted by permission from Journal of the American Dietetic Association, Vol. 85: 218, 1985.

because of the frequently encountered alterations mentioned above. Assessment of fatfolds (triceps and subscapular) can provide information, beyond weight and weight-for-height, relative to the child's fat reserves. In conjunction with arm circumference, they allow for an estimation of muscle mass as well.

Diet. Computerized nutrient analysis of a food record is ideal to evaluate the dietary intake. The data from this assessment are also frequently viewed by the family as a very scientific tool to identify the adequacy of their child's diet. A printed copy can serve as a constant reminder of the importance of diet, while providing written direction for behavioral change.

Laboratory data. Biochemical assessments can provide the precision and objectivity necessary to complete the nutrition assessment. As mentioned earlier, children on medications for long periods of time are vulnerable to drug-nutrient interactions and must have routine biochemical determinations in order to prevent potentially serious nutrient deficiencies.

Feeding. The feeding evaluation is essential for children with special health care needs and requires interaction among all the team members and the family. It should include assessment of oral structure and function, neuromotor abilities, developmental level, and mother-child interaction, as well as observation of a feeding situation for a comprehensive picture of the current status.

Intervention

In designing the nutrition care plan, assistance of colleagues on the team is also helpful for supplemental information about socioeconomic status, family concerns and expectations, and the education and developmental potential of the child. Components of the plan should be integrated into the individual education plan (IEP) or the individual family service plan (IFSP) with a sense of priority with respect to the other aspects of the child's disorder.

In developing plans, both short- and long-term goals should be formulated. For example, in some programs the use of high caloric density feedings is recommended, including foods which are high in cholesterol and saturated fat. While this may serve the short-term goal of weight gain, it might be at the price of increasing the long-term risk of atherosclerosis. We are not yet sure of the role fiber plays in the prevention of some gastrointestinal cancers. However, many children with feeding disabilities have diets low in fiber. In designing nutrition programs for those persons with chronic disabling conditions who are likely to live into adulthood, some thought should be given to the recommendation of diets and activity patterns which will be prudent in achieving long-term health goals.

Many children with chronic conditions tend to have frequent hospitalizations, during which time nutrition care plans are interrupted for long periods. It is necessary to have close coordination between community-based and hospital personnel, as well as the family, to assure that long-term nutrition goals are not lost, or that new recommendations are mutually agreed upon and understood by all. These children also have complications which may interfere with nutrition progress, such as periods of infections, a pain crisis, or the need for surgical intervention. It is important that complications which impair intake do not undermine a nutrition care plan which has been effective.

Referral

Community referrals should be made as close to home as possible and yet ensure quality care. An appropriate referral can set in place excellent resources for the family and the health professional who initiated it. The potential linkages are numerous, but include state Title V programs for children with special health care needs, state and local maternal and child health programs, WIC and other food assistance programs, university cooperative extension programs, public health nursing, school-based nutrition programs, local clinics, developmental centers, and others. The formation of good networks can maximize the resources to provide effective, efficient, and convenient services. Monitoring mechanisms can be put into place by using local evaluation systems or Standards of Practice from The American Dietetic Association. Identifying costs of care can help ensure accountability and continuity.

Advocacy

Advocacy can take many avenues, including the following strategies:

1. Increasing awareness of the needs of this population by the public and health care professionals;
2. Involving parents as advocates for their child's nutrition needs within the health care system;
3. Promoting nutrition services as an integral component of clinic teams and in the development of treatment plans;
4. Advocating for nutrition services from the prevention as well as the treatment standpoint;
5. Locating funding sources for program expansion;
6. Identifying educational needs of families and human service providers;
7. Influencing public policy and legislation;
8. Securing reimbursement for nutrition services; and
9. Identifying areas for further research.

Resources

Educational materials and services can be obtained from local providers, such as registered dietitians. Quality assurance criteria sets are available for certain conditions.[35] Written information is increasing at the lay and professional levels and is available from national, state, and voluntary organizations.[16] University affiliated programs, which have a mandate to train professionals in the provision of exemplary services to children with special health care needs, exist nationwide as excellent resources.[36, 37]

Qualifications of service providers

There are nine competencies identified by Kaufman as being important for effective nutrition/dietetic practice with children with special health care needs:

1. Knows principles of normal nutrition for growth and development and clinical nutrition as it applies to children at risk or with chronic illnesses/handicapping conditions.
2. Possesses basic knowledge and skills to improve the overall health and well-being of infants and children at risk or with chronic illnesses/handicapping conditions.
3. Knows principles of nutrition to assess factors affecting client's nutrition status and recommend the appropriate level of care for each infant. Integrates nutrition assessment into the Individualized Family Service Plan (IFSP).
4. Possesses knowledge and skill in developing, implementing, documenting, communicating, and monitoring the nutrition care plan.
5. Has skills in effective verbal and written communication to function effectively as a member of the interdisciplinary team.
6. Has knowledge and skill in consultation process for case management and program development.
7. Has skill in defining the scope, content, and delivery of quality nutrition services in family-centered programs.

8. Has skill in developing, implementing, and evaluating nutrition education programs at different levels to meet needs of children, families, and professionals, individually or in groups.
9. Has knowledge and skill in process and outcome evaluation (i.e., quality assurance, cost-benefit, cost-effectiveness analysis).[38]

Many of these competencies are essential for all members of the interdisciplinary team serving children with special health care needs to possess. For this reason, practitioners are best trained as team members in settings, such as university affiliated programs, which provide interdisciplinary training.[39]

Conclusions

It should be abundantly evident from this foregoing discussion that the consideration of the nutrition needs of children with chronic disabling conditions or illness is complex. Each condition carries a specific set of problems and solutions. There are also some general considerations which must be kept in mind in designing programs. Individualization is essential, for example. Overriding all of these considerations, however, is the obvious need for the involvement of an interdisciplinary team to effect the best outcome for the child.

Issues and Problems

Following is a list of issues and problems, related to the above discussion, which need to be addressed:

- In spite of the complexity of the nutrition problems of children with special health care needs, the numbers at risk, and the expanding documentation of the importance of nutrition to the optimal growth and development of children, there is still a general lack of awareness regarding the importance of nutrition for these children on the part of both professionals and parents. As a result, those providing health care or educational services to these children typically fail to recognize nutrition-related problems other than obvious overweight/underweight or severe feeding problems.
- There may be no uniform method for identifying a child at risk for a nutrition-related problem. There are few screening tools designed for use by nonnutritionists, and there is not always someone to train potential screeners on a statewide basis for those agencies responsible for providing service to children.
- The population of children with special health care needs has changed dramatically in the past few years. There has been a shift in emphasis from orthopedic conditions ("crippled children"), to children with developmental disabilities, the high-risk infant in need of specialized technology, the infant with a unique metabolic disorder, the child who is chronically ill, the child who is exposed to drugs, or the child who is infected with HIV. The sites for delivery of services are also shifting from major medical centers to community clinics, private practice, and home care. Discharge planning, however, does not always include a plan for nutrition follow-up. There is often poor coordination between tertiary centers and community agencies. Ideally, the tertiary center provider utilizes sophisticated techniques and technologies in conjunction with a variety of specialists to precisely diagnose nutrition problems and formulate

strategies to deal with complicated care needs. When the child is returned to the community, the ability of the caregiver to follow these strategies is often compromised because of the complexity of the nutrition intervention, or interfering sociocultural factors. Community-based nutrition support needs to be utilized.

- There is limited availability of adequate community-based nutrition consultation. Although nutrition resources may be limited within the tertiary center, there is generally a dietitian/nutritionist on the staff of a medical center who can be accessed when the need arises. Community service agencies frequently do not employ nutritionists/dietitians, however, and do not have ready access to their expertise.

- Rapidly advancing technology and home health care demand a certain level of proficiency and a broad base of knowledge. The nutrition problems of these children are difficult and require sophisticated clinical judgment and the development of detailed interventions for staff or parents to carry out. This presents a challenge to the education and skills of the dietitian. There are constantly new types of equipment, new products, formulas, feeding methods, and medications being introduced. In addition, it is important to determine if any combinations are contraindicated. At present, there are insufficient numbers of trained/experienced nutritionists/dietitians to meet this challenge.

- Entry-level dietitians need more education and supervised experience to achieve competency in this area, and there are now insufficient inservice/continuing education programs related to the nutrition problems of children with special health care needs.

- There is current underutilization of existing nutrition resources. This appears to be due to: unclear service eligibility criteria; lack of awareness of existing services or funding possibilities; lack of a system of referral to community service providers; and lack of awareness of the importance of nutrition as a factor affecting health and function.

- Quality assurance standards have been developed for some conditions of childhood, but there is a need for more standards related to children with special health care needs.

- It is difficult to identify funding sources to reimburse for nutrition services and/or the payment mechanisms are severely restricted. Coverage is particularly limited for community-based and nonphysician services which include nutrition. Ambulatory care reimbursement has traditionally been built on the concept that services which are integral to the physician's treatment plan are reimbursable through the physician's fee. Legislation such as P.L. 99-457 now specifies that nutrition services be delivered in a comprehensive, family-centered, community-based approach, but in many states this new opportunity for funding (in addition to Title V programs and Medicaid) is not being fully utilized. This is partly due to variability among states in implementing components of the law, and is perhaps also due to the lack of awareness on the part of policymakers or advocacy on the part of nutritionists.

- As of 1986, a survey reported that fewer than 25 state Title V programs for children with special health care needs employed full-time nutrition consultants.[31] This lack of a coordinator/program planner can result in fragmentation of, and gaps in, nutrition services, and, ultimately, to their unavailability to many children who could greatly benefit from nutrition intervention.

- There is inconsistency in the provision of nutrition services at educational and residential facilities. Not all settings serving children with special health care needs provide all components of nutrition services (e.g., screening, assessment, intervention).

- In spite of the recent increase in published research findings related to the nature and extent of nutrition problems seen in children with special health care needs, there is still a great need to explore these questions as well as issues concerning appropriate nutrition intervention and its cost/benefit. Examples of specific areas of research needs include:

    1. The role of nutrition in the etiology of growth retardation/abnormalities in disorders such as sickle cell anemia, babies exposed to drugs, etc.
    2. The energy needs of children with increased/decreased activity levels or decreased lean body mass (e.g., cerebral palsy, spina bifida, muscular dystrophy);
    3. The development of techniques/formulas for the accurate measurement of body composition in children with disorders associated with altered distribution of fat and lean body mass;
    4. The alteration in energy or nutrient needs of children who are chronically medicated (e.g., seizure disorder, spina bifida, autism, and congenital heart disease);
    5. The alteration in energy or nutrient needs due to chromosomal abnormalities (e.g., Prader-Willi syndrome and Down syndrome);
    6. The development of techniques for accurate growth measurement and monitoring in children with physical disabilities which preclude the use of standardized anthropometric techniques and disorder-specific reference data;
    7. The role of nutrition in the treatment of infants and children with HIV infection;
    8. The contribution of nutrition support to cancer therapy outcome;
    9. The long-term follow-up of the growth and development of high-risk infants related to their nutrition regimen in NICUs; and
    10. The documentation of the positive effects of early nutrition intervention on the infant's/child's ability to respond to other early intervention services.

Recommendations

The following list of preliminary recommendations incorporates those of The American Dietetic Association:[15, 25]

Clinical issues

- Implement the use of nutrition screening and referral tools for service providers to identify and refer children at risk.

- Implement the use of standardized protocols for nutrition screening, assessment, monitoring, and intervention.

- Continue to develop quality assurance standards.

- Refine nutrition assessment techniques for use with children with special needs.

Service issues

- Employ nutritionists with experience in chronic illness/developmental disabilities at the federal and state levels in agencies developing policies in the areas of education, vocational, and health services.

- Assure that all settings serving individuals with developmental disabilities/chronic illnesses provide, or have access to, nutrition services including screening, assessment, intervention, and education.

- Assure that adequate funding be available to operate interdisciplinary centers for assessment and treatment.

- Assure that all state and local health plans document the need for nutrition services and describe the procedure and resources for nutrition screening, assessment, intervention, and monitoring in order to provide coordinated services.

- Improve school food service for children with special needs.

- Assure that nutrition goals and objectives be included in IEPs and IFSPs where indicated.

- Improve third-party reimbursement for nutrition services, products (including specialized formulas), and food or equipment; assure that reimbursement be a part of comprehensive health care and considered a minimum basic requirement by both public and private insurance programs.

- Support development of nutrition components in home health care.

- Base nutrition services on an interdisciplinary approach that supports and contributes to a comprehensive, coordinated, community-based, family-centered system of care.

- Develop more effective documentation systems so that nutrition services can be expanded based on need.

- Expand linkages with existing community programs (e.g., maternal and child health, university cooperative extension programs, and others) so that children at risk are identified early and appropriate referrals made.

- Develop improved referral mechanisms between tertiary centers and community-based providers.

Training issues

- Incorporate principles of nutrition care for children with special health care needs and clinical experiences in interdisciplinary settings into curriculums of nutrition programs, dietetic internships, and preprofessional practice programs.

- Require completion of a training program specializing in nutrition of children with special health care needs for nutritionists taking leadership positions in the provision of services.

- Increase and improve opportunities for training dietitians in the knowledge and skills needed to work with children with special health care needs so that they are more comfortable delivering services in nontraditional settings such as homes, schools, and day care centers.

- Develop more written or videotaped materials for families to improve their level of knowledge and confidence in feeding their child.
- Sponsor more multidisciplinary/multi-agency workshops to strengthen networks involved with these children.
- Increase awareness of the importance of nutrition and provide training to promote the appropriate level of nutrition knowledge and skill among all human service providers who assist children with special needs and their families.
- Increase awareness of the importance of nutrition to "new" conditions such as pediatric AIDS, "cocaine babies," and the like.
- Increase skills of current practitioners in learning to deal with agencies and professionals who are "new" to nutrition professionals (e.g., school personnel, family counselors, and others).
- Assure that undergraduate and graduate nutrition programs include content and/or field experiences that address the nutrition needs of children with special health care needs.

Research issues

- Support research to augment our understanding of the nutrition needs of children with special health care needs, including altered energy and nutrient requirements and drug-nutrient interactions.
- Support research into ways to prevent the birth of children with special health care needs (i.e., chemical abuse, improved prenatal care).
- Document the positive effects of nutrition intervention on the growth and development of children with special health care needs.

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Needs Assessment for Nutrition Activities in Maternal and Child Health

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The goal of all nutrition services is to promote health by achieving and maintaining optimal nutrition status. To attain this goal, a systematic and continuous process of assessment, planning, implementation, and evaluation is required.[1-3] The first step is identifying needs—those undesirable conditions in which something required or desired is lacking. Once needs are identified, specific objectives are developed and plans are made for activities to address the identified problems. Activities are then monitored, based on the stated objectives, to evaluate attainment of objectives and progress in solving the problems and needs. This becomes a cyclical process that is repeated as new needs arise and changes occur, ultimately resulting in improved health of the target population. In community-based, family-centered programs, this process involves the entire health care team of professionals and families.[4-7]

Needs assessment is a two-part process involving analysis and diagnosis.[1] Analysis includes assembling and collecting information that:

1. Describes the strengths and needs of the population, including the prevalence and distribution of nutrition-related health problems;
2. Suggests problems that may need to be addressed;
3. Describes the ecological factors associated with these problems;
4. Permits prioritization of needs; and
5. Suggests possible solutions and directions for change that can be applied to both service providers and the target individual or group.[3, 8, 9, 10]

Diagnosis is the conclusion(s) drawn from analysis, and the development of problem statements based on those conclusions. In this chapter, we review the basic concepts behind needs assessment and propose areas for further discussion and research.

What Is Needs Assessment?

Needs assessment identifies what needs to be done and for whom.[3] It can be used to establish priorities so that resources and services are targeted toward those individuals or groups whose needs are the greatest and for whom it is most likely that identified problems can be resolved. It can also reduce the possibility of targeting resources to problems that are less amenable to change.

In family-centered, community-based programs, a needs assessment helps nutritionists understand the community's needs and interests, and helps families to better understand the problems of their own community and the resources available to address those needs. Professionals provide coordination and technical expertise for the assessment, while families provide direction for planning and implementing services based on their expectations and life experiences.

The process of assessing needs can be applied at many levels and in many settings, from the single individual to entire communities. Direct care providers use it most often to assess an individual client's nutrition status and the factors that contribute to it. Together with the individual and/or the family, a nutrition care plan is developed.

The needs assessment process can also be applied at the agency level and used in decision-making about policies and priorities. The process might be used to decide which of the Year 2000 National Health Objectives for nutrition will be addressed by an agency; or to describe the dimensions of the nutrition component of an agency's adolescent pregnancy initiative.

Community needs assessment refers to identifying the problems of an entire population or subgroup whose members have something in common, such as geography, gender, age, culture, health problems, or health service providers. In maternal and child nutrition, needs assessment focuses on describing the needs of the "community of women and children" served by an agency or program and those health and social factors that may affect or be affected by nutrition factors. The community may be defined in different ways by different agencies. The community served by a state Special Supplemental Food Program for Women, Infants, and Children (WIC) agency will be women, infants, and children meeting income and health criteria; the state MCH agency will include a larger group in its definition of community.

Whether the community is defined as a whole population, a subgroup, or only those individuals seen in a program, a needs assessment must be consistent with the mission of the agency and the population it serves. When planning a needs assessment, one must first be familiar with the agency's goals, services, and activities, and then look at the problems of the specific groups or populations served by the agency. Data on the community's characteristics, general health status, resources, and family interests can then be used to develop a nutrition services program plan that is consistent with other services.

Data Elements in Needs Assessment

Data for needs assessment can be grouped conceptually into elements that (1) describe the needs or problems of the target population, (2) indicate a desire for solution by the target population, and (3) suggest that solutions to the problems exist.[11]

Description of needs or problems

The definition of need is very broad, reflecting the difference between the actual situation and the one desired. It can describe a condition (hunger), deficiency (inadequate food intake), or desire (easier access to the Food Stamp Program). Because needs may not always be measurable, it is necessary to state them as problems that can be quantified. As a practical matter, it is useful to think of needs assessment as a description of the problem(s).

The data in a needs assessment describe not only the problem, but also the nature and extent of the problem, who is affected, and the social or health conditions associated with it. It includes a description of the community and a review of the resources available for handling needs. These data elements may be organized into four categories: community characteristics, health outcomes profile, health status profile, and community resources. Each of these categories may be as detailed or general as is needed to meet the specific goals for the needs assessment being conducted.

Community characteristics. This information describes the community or target group. It helps put the identified problems and potential solutions in context with the setting where the people live and problems evolve. A description of community characteristics might include:

1. Where the community is located and environmental factors, such as climate,

water supply, and degree of urbanization, that influence living there;

2. Population factors, such as size, gender and age distribution, family characteristics, racial and ethnic composition, education levels, housing, income, and employment status;
3. Information about the political and social system, such as government organization and services, the educational system, the food supply system, and available housing and transportation;
4. Information about the major businesses and industries that provide employment and employee benefits, and descriptions of associated occupational risks.

Sources of this information are the national census, state vital statistics, chambers of commerce, local government agencies, school systems and boards, agricultural extension services, community action centers, and advocacy groups. The Current Population Survey conducted by the U.S. Bureau of Labor Statistics provides information on unemployment and labor force participation. Other national data sources are the Consumer Expenditure Survey and the Survey of Income and Program Participation.

Health outcomes profile. This profile describes the population's health outcomes and points to specific problems that may exist. Included might be such vital statistics as birth rate, total births, births less than 2,500 grams, and births to women who participated in early prenatal care and to women less than 18 years. Morbidity and mortality data describe the incidence of diseases, especially those most affecting women and children; percentage of children with special health care needs; causes of death; fetal, infant, neonatal, and maternal death rates; and overall mortality.

Data are available from state Vital Statistics Bureaus, health departments and hospital discharge files. National data from the National Center for Health Statistics' record-based systems can be used for comparison in evaluating state or local reports. These data include death registration, birth registration, and follow-back surveys of births, deaths, and fetal deaths.

Health status profile. The health status profile describes the health-related factors and practices that contribute to documented health outcomes. Data for this profile might include information obtained from dietary, anthropometric, biochemical, and physical assessment. For example, correlations might suggest the extent to which overweight, underweight, and anemia contribute to childhood morbidity. Information about weight gain during pregnancy may relate to the percentage of low birthweight births, while the percentage of women who breastfeed may relate to the prevalence of infectious diseases in infants. Other health status measures of value in maternal and child community assessment may include feeding and dietary practices; use of fluoridated water or supplements; dental conditions; risk factor assessment (including blood pressure and serum cholesterol); and nutrition knowledge and attitudes.

There are a variety of sources of nutrition status data available at local, state and national levels.[17-19] Information in client records is available to local programs and agencies. If key data have not been kept according to some aggregate system, chart reviews may be necessary. At the state level, many states have standardized reporting systems for maternal and child health, nutrition, and/or WIC program data.

Other sources of information include the National Center for Health Statistics (Vital Statistics, National Health and Nutrition

Examination Survey [NHANES], National Health Interview Survey, National Hospital Discharge Survey); U.S. Department of Agriculture (Nationwide Food Consumption Survey, Continuing Survey of Food Intakes by Individuals [CSFII]); Centers for Disease Control (Pediatric and Pregnancy Surveillance Systems and Behavioral Risk Factor Surveillance Systems); Food and Drug Administration (Total Diet Study, Vitamin and Mineral Intake Survey, Survey of Infant Feeding Patterns); Public Health Foundation (National Public Health Reporting System); and Medicaid (Early and Periodic Screening, Diagnosis, and Treatment [EPSDT]).

Community resources. This portion of the needs assessment describes the resources available to address problems. It is an identification and description of the community's health professionals, specific health and social service agencies, and supplemental food, nutrition, and health programs. It provides information on the number, kinds, location, and staffing of the community's hospitals, home health care programs, birthing centers, family planning centers, voluntary health organizations, and official health agencies. Food and nutrition programs that might be summarized are child nutrition programs such as the National School Lunch Program, the National School Breakfast Program, the Summer Food Service Program, and the Child Care Food Program; WIC; the Food Stamp Program; the Head Start Program; the USDA Extension Service, including the Expanded Food and Nutrition Education Program (EFNEP); and emergency food facilities. Local hospital, clinic, or other provider records can provide estimates of nutrition-related services received. Reviews of hospital and agency policies can suggest influences on health behaviors, including infant feeding.

The assessment of community resources should include an analysis of barriers to care, such as eligibility criteria, application and referral policies, location and hours of services, financial constraints, lack of transportation, cultural impediments, and other relevant information.[4, 14] Gaps and duplicate services should also be identified. This information can then be used to suggest possible avenues for cost sharing and expansion of resource and referral networks.

Desire for solution

The second conceptual area of the needs assessment describes the target population's priorities and identifies what problems it wants resolved. It requires consumer participation and recognition by professionals of the importance of the consumers' contribution.

Health care is but one factor in an individual's life. The family and environment in which an individual functions is a significant determinant of overall health-promoting practices and resulting health outcomes.[4] Service providers and the systems within which they work change, leaving the ultimate responsibility for community health with the members of that social group.[6] Families, therefore, need to participate in the assessment of their health care needs and provide direction in planning the services provided by the health care agencies.[6, 7, 8, 15] This directs planning toward a family-centered approach to health care and away from an institution- or agency-centered approach.

The traditional institution- or agency-centered planning approach focused on the problem description component of needs assessment from the professionals' perspective. Plans and services were developed based on this limited information. There have been reports that such "expert-defined" problems are sometimes at odds with those defined by the consumer.[5, 16, 20] One report compared three methods of needs assessment to identify nutrition education needs of mothers of preschool children. The first method asked mothers to identify what information they felt they needed. The other two methods were "expert" assessments (one based on food intake, the other on nutrition knowledge scores). There was no significant correlation between any of the measures, except for a weak correlation between the mothers' felt-need scores and the food intake scores of their children with respect to the fruit and vegetable group.[16]

Cultural expectations also impact upon how services are perceived by the target population. Involving the target population late in the assessment and planning process can pose problems. For example, some Native American cultures attribute health status to fate and nature. This contrasts with the beliefs of other cultural groups who attribute health to an individual's personal control of behaviors.[12, 13] A needs assessment using a "from-the-top-down" approach involving only professionals and based on one cultural group's values will most likely meet with resistance from the target population.

In contrast, consumer involvement can lead to improved services and satisfaction. In one international project to reduce malnutrition, Pacific Island community members planned and implemented their own projects with assistance from external professionals and in association with the maternal and child health programs in local health departments.[5] Positive outcomes were achieved through increased availability of primary care in rural areas.

In Massachusetts, Project Serve is an example of a family-centered approach aimed at improving services for children with special health care needs.[6] Parents, direct care service providers, health care insurance providers, and others were surveyed to assess needs and identify resources and gaps in current services. The findings reflected views of both providers and consumers and led to recommendations for major restructuring of the way services are provided. This project laid a foundation for subsequent planning that could more effectively meet the needs of children and families.

Community and family interests. Determination of a community's interests involves meeting with its members directly. Some members may be reluctant to participate in the planning process at first. However, the importance of their role should be emphasized and their participation encouraged as a critical factor in balancing professional recommendations with the community's and families' priorities and expectations. Families are likely to see gaps in availability, flexibility, and coordination of services; financing health care costs; and emotional stresses upon the family unit.

To encourage participation and determine community concerns, many techniques may be used, including surveys, ranking exercises, community forums, focus groups, and community advisory boards. Key informants to involve are grass-roots, community action, and advocacy groups; community and religious leaders; public officials; and educators.[5, 8]

Resolution of the problem possible

The third conceptual area of a needs assessment concerns possible interventions. Problems that are consistent with the agency's mission should be addressed in a cost-effective manner. Some problems may not be consistent with the agency's mission or may be resolved better by other public, private, or voluntary health agencies. A review of the literature may suggest interventions that have worked in both similar and dissimilar settings. Once potentially effective interventions are identified, their costs must be estimated. There may be a variety of ways to solve some of the community's problems, but lack of available resources or high costs may make some alternatives prohibitive. Moreover, any solution to a problem must be supported and used by the population to which it is targeted.

Consideration of how to solve identified problems allows planners to rank the problems in priority order, modify program plans, and avoid diverting resources to areas where goals may not be attainable.

Data Sources and Use

In the discussion of data elements, sources of several types of information were identified. It is clear that there is a great deal of information available from sources ranging from individual client files to large national data bases.

National data sets

The use of data derived from the community being assessed is usually preferable because such data are viewed as being the best representation of "the way it is here." If there are no systems in place that allow easy retrieval of high-quality data, however, using data from national surveys and special studies and extrapolating these findings to the local community may be better than waiting until local systems can be established.

There are several applications that make national data sources extremely useful for needs assessment at the community level.[19] It is possible to make synthetic estimates of risk, morbidity, or mortality from various causes in the local community based on national data. For example, by applying demographic characteristics in the local community to data from NHANES, it is possible to estimate the number and percentage of children served by the agency who are likely to be anemic, have elevated cholesterol levels, be overweight, or have any other health status indicator for which NHANES has data.

If agency program data are available, it is possible to compare the estimated prevalence to the reported national prevalence and to describe how well or how poorly the population is doing with respect to a particular parameter. Furthermore, national data provide standard definitions and methods that provide guidance for developing the agencies' data bases and making comparisons.

Development of program data sets

Data derived from actual service programs are extremely useful in needs assessment. A system for ongoing, continuous data collection is the preferred approach. In developing such a system, care must be taken to assure that the data are collected and reported in a uniform manner. In using the system, it is important to be aware of its inherent limitations. Most state and local health agencies have attempted to address the need for program data, although the methods may be quite different from agency to agency and the quality of the data unknown.[17]

Caveats

In presentations for the MCH Continuing Education Institute, Peck noted several caveats regarding data:[19]

1. *Availability.* Whenever possible, data that are already available should be used. Collection of new data will increase the cost of the needs assessment enormously.
2. *Quality.* In order for conclusions to be acceptable, data must be complete, accurate, valid, current, and sufficient in quantity.

3. *Comparability.* Data should be collected in such a way that they can be compared to those from other data sources and from other populations.
4. *Accessibility.* Data must be available at a reasonable cost and must assure the confidentiality of individuals.

Conducting a Needs Assessment

The quality and acceptance of the needs assessment will be enhanced by the involvement of the individuals and professionals who will be affected by it, including both those in favor of and those with reservations about the agency's programs and services. For effective programming to take place, community support should be sought and actively nurtured. It is therefore important to involve families and health professionals, including maternal and child health directors, public health nutritionists, administrators, physicians, nurses, human service professionals, dental specialists, health planners, and statisticians.

Step 1. Assemble a technical advisory group

The process of assessing community needs requires not only knowledge of the community, the agency, and maternal and child health programs, but also skills in data management, use, and analysis, and community organization. Few people possess all these skills and abilities. Most health agencies have staff with expertise in these areas who can provide guidance and assistance in the needs assessment process; it is important to include them in the process.

Step 2. Identify the goals for the needs assessment

A clearly written statement of the assessment's goals guides subsequent steps and enhances understanding of the process. Goals might include determination of high-risk groups, identification of nutrition status problems, predicting areas for future program development, establishing nutrition education priorities at various points in the life cycle, defining areas of responsibility for the agency or program,[20] or identifying areas for further research to enhance program planning and service provision. Keep in mind that the purpose of a needs assessment is to identify problems and resources for use in planning, not just to do a needs assessment for its own sake.[2]

Step 3. Determine the scope of the needs assessment

The scope of the needs assessment will be determined largely by the mission of the agency, the specific goals of the assessment, and the resources available. Nutrition problems among adolescents may be the greatest ones in a community, but if the agency serves only children under the age of five, it is difficult to justify the time and money involved in assessing adolescent needs. A needs assessment whose aim is to determine the degree to which the agency "meets" the Year 2000 National Health Objectives will focus only on those areas for which objectives have been written.

The scope of the assessment may be narrowed by the time period in which the data will be assembled and analyzed; the type of data to be assembled and how it will be analyzed; staff utilization plans; and refining of the definition of the target population or community. A program addressing children in day care might target the assessment to children in a single day care center located in a specific section of town. Alternatively, planners might do a broader assessment of the needs of all children in day care or of a smaller subgroup of children with special health care needs.

Step 4. Determine data elements needed

Based on the goals of the needs assessment, decide what information will be needed in order to diagnose a problem. Which health outcome and status measures are essential? What information is needed from community agencies? What community characteristics are relevant? What issues will be addressed by consumers?

Careful analysis is important here, as the tendency is to gather more information than is needed. Collection of unused information represents a significant cost in terms of the time needed to collect, process, and record information and adds to the total cost of the needs assessment. Few agencies or organizations can afford to collect information that cannot or will not be used.[17] It saves time and money to use existing data when it is used appropriately and within its limitations.

A patient/client profile of a maternal and child health agency or institution might include a description of the clients (age, gender, socioeconomic status, educational level) and their expressed needs (help with toddler's eating habits), length and frequency of appointments, diagnosis (poor pregnancy weight gain, anemia), and specific nutrition parameters (diet intake, weight, hematocrit). A community profile might include community characteristics (demographics, geography, social, political and economic systems, and businesses), health outcomes or status (low birthweight, homeless children), community members' expressed needs (breastfeeding classes, day care meal standards), and other resources (voluntary, official, and private health agencies).

Step 5. Determine sources of the data, how it will be obtained, and by whom

For each data item selected in step 4, identify the various potential sources of the information and select those that will provide the best information for meeting the goals of the assessment within the constraints of available resources. This involves determinations such as whether or not data will be extrapolated from client records; which national data set might be most appropriate; or who has the best information on the particular community.

Investigate whether other groups or agencies have collected the information for another needs assessment or grant proposal, or whether graduate students in public health nutrition have collected the information for student projects. Any of these resources can significantly reduce the amount of effort needed. Gathering available information is an important component of community assessment.

To identify consumer opinions, surveys will often have to be developed and tailored to the specific community. It is especially important that the consumer interest component be planned with the help of consumers to be sure that it reflects their needs and interests and encourages their participation. If surveys are not used to collect data, interviews with key informants, community forums, intercept surveys, or focus groups should be considered.

Step 6. Assemble and analyze the data

The procedures for analyzing the data should be clearly established before existing data are gathered or new data are collected. Include how data will be analyzed statistically and how priorities will be established. If appropriate, decide what standards will be used for deciding if a problem exists. Will overweight be defined as above the 90th or the 95th percentile for height? What is considered "excess" low birthweight, more than 5 percent of births, greater than the statewide mean, or two standard deviations above the mean?

Determine how decisions will be made about what constitutes a problem and how ranking will be done. For example, priorities might be established using the nominal group process. Alternatively, professionals and family members or community representatives might rank the top five problems and from this ranking establish priorities based on mean group ranks.

Step 7. Develop a statement of the problem(s) or community diagnosis

Using the data and the procedures established prior to data gathering and collection, group the data into problem areas and examine it in detail to decide whether or not it can be described clearly as a problem. For each need, write a problem statement that includes the scope of the problem, who is affected, a description of the community in which the problem exists, the interests of the family or community, and whether the literature supports it as a nutrition problem amenable to solution. These problem statements can then be used to guide subsequent planning.

Current Activities in Needs Assessment

Title V

The 1989 renewal of the Block Grant for Maternal and Child Health requires each state to undertake an extensive needs assessment for the MCH population. A wide range of demographic, health outcome, health status, and health resource measures are to be included for states and subdivisions within the states. It also requires reporting of health service data for the Medicaid-eligible population. Many of the components have implications for nutrition services and provide the opportunity for combining nutrition needs assessment activities with the broader MCH assessment.

Year 2000 National Health Objectives

The U.S. Public Health Service will publish updated health objectives by the end of 1990. These objectives, which have undergone a great deal of review by various government, health care, and consumer groups, will identify specific health outcomes that are desired for the year 2000. Various governmental agencies are now in the process of identifying a variety of elements and sources for evaluating these objectives. This data set, in addition to program data, constitutes an important element in planning for needs assessment for the next decade.

WIC minimum data set

The U.S. Department of Agriculture and the National Association of WIC Directors have developed a minimum data set that will be used by all WIC programs. The data set includes many status and outcome parameters and will be a useful tool in needs assessment for that population.

Other projects

Several other organizations have developed data sets and/or objectives that can be useful in planning a needs assessment. The Public Health Foundation is currently redesigning the minimum data set for the National Public Health Reporting System; the American Public Health Association has published *Model Standards: A Guide for Community Preventive Health Services*, and the Association of State and Territorial Public Health Nutrition Directors has published "Model State Nutrition Objectives."

Issues in Needs Assessment

Methods

Needs assessment is an integral part of the planning process. Much has been written on how to conduct an assessment. It is found in the literature for health education;[1, 8, 21, 23, 24] public health nutrition;[2, 3, 18, 23, 26, 27] and maternal and child health.[19, 28, 29] There continues to be confusion about needs assessment, however, with no clear differentiation between the types of assessment that might be needed or between the methods that might be employed. Most importantly, needs assessment often is not done.

Most needs assessment strategies described appear far more involved and complicated than many nutritionists feel comfortable undertaking. Few nutritionists are in a position to step back from day-to-day activities and focus on this one area. Yet, effective program planning requires a sound basis for defining needs and establishing priorities.

Assistance in some types of data collection, particularly collection of health status data, is currently available, mostly from the Centers for Disease Control's surveillance programs. Additional assistance related to other health status indicators, data analysis,[30] and how families and community members can be involved to identify their interests would be helpful.

Community-based, family-centered care and assessment

There is little information available about the role of cultural, family, and community values in relation to health promotion in general and to maternal and child health in particular.[4, 32] Service providers need to understand how staff can work more effectively with target populations whose language, religion, education, or family structure are different from their own. What strategies are helpful in stimulating community involvement in assessment and what questions should be asked? Who are the important family members to involve when working with different groups? For example, in some cultures it may be the father or grandmother who makes determinations on breastfeeding. How, then, can professionals involve these key people in the assessment and planning process so that effective interventions can be planned? These are but a few of a host of questions related to how health professionals can work better with target populations and plan community-based, family-centered programs while avoiding the problems associated with agency-based, staff-centered programs.

Data

There is a need for up-to-date, ongoing monitoring data that can be used in needs assessment and program evaluation.[17, 30, 31] Current efforts at data collection have evolved with significant gaps and discrepancies. We have extensive information on anthropometric and hematologic status of low-income children through the Centers for Disease Control's Pediatric Nutrition Surveillance System. Recent enhancements to the Pregnancy Nutrition Surveillance System will expand data in this area. The NHANES data is also a valuable source of information on health status. There is, however, a need for much more data regarding other aspects of health status, dietary knowledge and behaviors, and participation in food assistance programs. Many state agencies have data systems that are quite good, but all have gaps and shortcomings in reliability and use.[17]

As indicated earlier in this chapter, there are a wide variety of surveys and data bases available, each describing various aspects of how food, nutrition, and access to health services relate to health. This diversity is a problem as much as it is an asset. Professionals must understand how to access and organize data so that it is available on a regular basis and not just when needed for an assessment. More knowledge and skill is needed in the analysis, interpretation, and application of nutrition surveillance data. Standardized methodologies for reporting information about nutrition knowledge and practice would also make needs assessment more efficient and allow for more appropriate comparisons and recommendations.

Resources

Support for needs assessment within agencies is often minimal. To some professionals, it may seem unnecessary to identify more problems when staff are already busy. Needs assessment might help alleviate this problem, but without resources—staff and financial—identified for this purpose, it is unlikely to occur. Furthermore, some professionals may lack the appropriate public health training to plan community-based programs arising from an assessment of the community's needs. This lack of training may interfere with effective program planning and cause professional frustration, leading to personnel turnover.

Recommendations

1. Determine the barriers to conducting needs assessments among health agencies and prepare a continuing education program and manual that addresses the barriers, describes steps in needs assessment in detail, and provides specific examples from nutrition and maternal and child health. The program/manual should include appropriate methods for the various settings in which public health nutrition services are provided, strategies for needs assessment at several levels of sophistication, sources of data, data management and analysis, and problem definition. This might be part of a larger manual on program planning.
2. Increase consultation from the Maternal and Child Health Bureau to state public health nutritionists. The new procedures for applying for Title V block grants clearly delineate the role of states in describing communities' needs to justify funding. Consultation on how to conduct needs assessment efficiently, pertinent information to include, and the use of national data sets would be beneficial.
3. Enhance continuing education and technical assistance to states and localities in the development and use of effective data management systems.
4. Fund research activities that document nutrition knowledge, attitudes, and behaviors, and describe the relationship of these factors to health status and outcomes.
5. Provide continuing education opportunities on community-based, family-centered care and assessment. Specifically, show how model programs have involved families and communities in identifying needs and planning community-based interventions.
6. Support efforts to develop a national nutrition surveillance system that is timely, uses standardized methods for reporting data on nutrition status, knowledge, and practices, and permits better understanding of the relationship of food and nutrition status to health. Such a system should address the needs of special populations, including women, children, children with special health care needs, and the homeless.
7. Provide adequate staff, time, and funding for needs assessment in order to provide a sound foundation for planning.
8. Support personnel systems that require academic preparation in public health. Such preparation should include train-

ing in public health policy and administration, biostatistics, epidemiology, and environmental and occupational health. For public health nutritionists, training in community nutrition that includes didactic and field experiences related to the program planning process is appropriate.

Summary

In community-based, family-centered programs, health professionals, community members, and families work together to plan programs and services. Needs assessment is the first step of this planning process, laying the foundation for appropriate setting of goals and objectives that will address existing problems most effectively. Public health nutritionists have knowledge and skills in this area that could be enhanced by an up-to-date and ongoing monitoring system, technical support, and staff and financial resources. They would also benefit from (1) specific information on how to conduct needs assessment in maternal and child nutrition as part of the nutrition program planning process and (2) documentation of experiences and projects that are community-based and family-centered, particularly in diverse population groups.

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Planning, Implementation, and Evaluation of Nutrition Programs

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Public health nutritionists must take a leadership role in assuring that comprehensive, community-based nutrition services are available to promote optimum nutrition for mothers, infants, and children.

After a decade characterized by a reduction of federal mandates and funding and a shift to state and local priority setting, nutritionists face different challenges in the 1990s. Public support for services for mothers and children is being impacted by emerging social trends: a booming global economy, privatization of public services, female domination of the information society, a shift to democratic self-management, and a religious revival.[1] In addition to these trends, nutritionists should be attuned to the renewed political interest in the education, health, and well-being of young children as a necessity for future global competition. Nutritionists must help policymakers recognize the importance of nutrition programs and services within this milieu.

The report *The Future of Public Health* identified the responsibilities of public health as:

1. Assessment—collection and interpretation of data, problems and causes, trend forecasting, and evaluation of outcomes;
2. Policy development—priority setting, policy leadership and advocacy, mobilization of resources, constituency building; and
3. Assurance—assure necessary personal, educational, or environmental health services to reach agreed-upon goals by encouraging or requiring action by other entities or by provision of services directly, and guarantee a minimum set of essential, high-priority health services.[2]

These responsibilities underscore the importance of nutritionists' involvement in policy planning, where priorities are established and programs are selected. This must be in addition to nutritionists' leadership in implementation planning, which should result in design of interventions that support optimum nutrition for mothers, infants, and children through efficient, effective, culturally sensitive, and equitable nutrition programs and services. Nutritionists must also take a lead role developing collaboration among nutrition-related service providers and in establishing standards and protocols to assure that nutrition services are available and of acceptable quality.

By carrying out these responsibilities and being attuned to emerging trends, nutritionists will contribute to the mission of public health: "The fulfillment of society's interests in assuring the conditions in which people can be healthy."[2]

This chapter provides guidance to nutritionists in their roles as planners, implementers and evaluators. It challenges nutritionists to create a vision for nutrition and to bring that vision to reality through the design and implementation of innovative programs that impact on priority goals and objectives.

Planning

Planning is an iterative process of forward-looking, action-oriented activities through which uncertainty is reduced and change is anticipated and initiated.

Successful planning considers a range of internal and external issues, and trends and opportunities, and establishes commitment to a course of action.

Planning is a part of the total management process which consists of planning, organizing (which includes staffing and budgeting), directing, and controlling (commonly referred to as monitoring and evaluation). When done well, planning has great payoffs. It results in articulation of a mission statement, goals, objectives, and program activities that can be communicated to others. Planning organizes and directs effort, relates resources to desired goals, and sets benchmarks in the form of measurable objectives for evaluation. Through involving many constituencies in the process, planning develops commitment to mutual goals and motivation to act, and serves as a basis for cooperation with other organizations. Effective planning of public health nutrition programs can result in coordinated efforts throughout the food and nutrition and health care systems.

In rare situations, gifted leaders with an intuitive ability to anticipate the future provide direction without formalized planning processes. In other situations, a process of "muddling through" is used to avoid the inherent conflicts of prioritization and decision making while allowing for spontaneous response to opportunities as they emerge. However, formalized planning more efficiently focuses effort, commitment, and resources on agreed-upon priorities consistent with community values and needs.

The greatest challenge of public health planning is to balance objectivity and creativity while accommodating the interests and priorities of constituencies and the political and value systems that determine those interests and priorities. Nutrition planning is influenced by the internal culture and capabilities of the organization, but it is also influenced by the public agenda, by the state of scientific knowledge, by the wants and needs of families, and by official positions of experts and professional groups. Several important documents will influence nutrition planning for mothers and children in the 1990s (e.g., *Promoting Health/Preventing Disease: Year 2000 Objectives for the Nation*[3] and *The Surgeon General's Report on Nutrition and Health*[4]).

Defining the planning task

The planning task is determined by the scope, time horizon, and nature of the commitment. *Scope* refers to the organizational level of the planning effort. *Time horizon* is the period allowed for impact of action to be felt. *Commitment* is the description of the desired result. As illustrated in figure 9.1, the specificity of the commitments is related to the time horizon, and shorter-term plans evolve from long-term commitments. The highest level of planning involves establishment, revision, or reaffirmation of the organization's mission. Such commitments express organizational values and are usually quite stable. Also at this level, broad goals are set that establish a focus for the activities of the organization. Mission statements and goals express long-term commitments, set boundaries, and provide direction for intermediate and short-term programs and interventions.

Intermediate-term plans cover a period of 3 to 10 years. These plans define major priorities, and answer predominantly questions of what, why, and to whom. At this level, comprehensive nutrition program plans target efforts for several years. Alternative programs and their potential for impact on priority needs are identified and assessed.

Long-term and intermediate plans are sometimes referred to as rolling plans since

	Time Horizon/Organizational Level	Information Base	Nature of Commitment
Policy Planning	Long-term planning, 10–20 years State and local health agency	Review of legal mandate history and philosophy Environmental audit Social, political, economic, epidemiologic, demographic, and technological trends	Mission statement Broad organizational goals
	Intermediate planning, 3–10 years Nutrition unit	Community nutrition needs assessment Nutritional needs by age, target group, geographic location, inventory of existing services	Comprehensive nutrition program plan goals and objectives Prioritization of programmatic focus area
Implementation Planning	Short-term planning, 1–2 years	Review of scientific basis for intervention strategies	Outcome objectives
	Intervention design	Market research Target population perception of wants and needs	Selection of specific interventions Process objectives
		Formative evaluation	Protocols Standards of performance

they are reviewed periodically, but the strategic direction they set is often reconfirmed and only incrementally modified. Qualitative shifts in direction, however, are most likely instigated and communicated in intermediate plans. Major changes in emphasis and/or approach require time for education and mobilization of support (some call this "marketing"); development of implementation plans, recruitment, training, and development of personnel; and development of a funding base. *Using Health Objectives to Make a Difference* illustrates the use of national health objectives to shift program direction.[5]

Short-term plans are frequently tied to the budget cycle and spell out specific programs and interventions that will be implemented in the coming year. These program plans address the questions of where, when, how, and by whom.

Annual program reviews and planning have traditionally driven nutrition program efforts. However, it is through intermediate planning that the nutrition director is able to develop a *vision* for comprehensive nutrition services in the community. The articulation of a vision and the ability to instill the vision in others is the essence of nutrition leadership and is essential if public health nutrition is to move into the future with innovative programming that anticipates and addresses emerging issues and problems faced by mothers and children.

The higher levels of planning have been referred to as policy planning by Mastrine.[6] Policy planning is a function of upper administration. Commitments made at the policy level influence resource allocations. Nutritionists need to be involved, not only in determining priorities for nutrition, but in contributing to policy development in other units and the organization as a whole.

Planning as shared responsibility

Planning is a responsibility that goes beyond administrators and program managers. Involving others strengthens the process. Personnel responsible for implementation bring practical knowledge of program operations and capabilities. Client involvement assures that community needs are addressed through acceptable methods. Collaborative planning by providers, advocates, and related constituencies in the service network avoids duplication and helps assure that limited resources will be used efficiently.

Collaborative planning bridges organizational and ideological boundaries, identifies mutual goals, and builds cohesion and capacity to act together. Principles of collaborative planning include: (1) development of awareness of common problems and goals across organizational boundaries, (2) building of cooperation around identified commonalities, (3) orchestration of planning activities to gain and maintain cooperation throughout planning and implementation, (4) assuring that constituencies retain their own identity while developing ownership of and recognition in collaborative activities, and (5) use of small successful collaborative efforts as stepping stones to future collaboration.

Several models for collaborative planning exist. A process of interagency collaborative planning developed and tested by Van de Ven[7] has been used successfully to deal with complex community issues such as child care. Community development models are being recommended for community-based health promotion programs.[8]

Planning can be used to build commitments to mutual goals and activities; this in turn leads to exchange of information, resources, and clients. Open planning processes help accommodate different interests and values, foster orderly decision making, and enable development of realistic goals and objectives and feasible implementation plans. In determining the planning task, planners should make conscious decisions about what constituencies to involve at each stage of the process.

Information for planning

Decision making is crucial to planning at all levels. Commitments are established after assessment of relevant data. Figure 9.1 indicates the type of information that guides decisions at each level.

Health planning customarily starts with demographic, socioeconomic, and epidemiologic data to create indicators of health status which are then compared to an ideal.[9] The resulting description of needs is compared against an inventory of available public and private services, and utilization data when available, to identify gaps in the system. The limitation of this approach is that knowledge of the cost and distribution of services and the impact of services on identified problems (outcome) is rarely available.

More comprehensive data about program operations, service statistics, personnel utilized, productivity, and cost-effectiveness information in relation to program goals and objectives are desirable. However, development of standard indicators, and of evaluation and information management systems, is necessary before such data will become readily available.[9–11] These issues are being studied, and a prototype nutrition monitoring system has been proposed for California.[12]

Other information-gathering methods can enrich the data base for planning. The environmental audit is a process of broad-scale information gathering about the social, political, economic, epidemiological, demographic, legal, and technological trends in the environment (both external and internal to the organization). It results in an analysis of strengths, weaknesses, opportunities, and threats (SWOT analysis), and in the identification of strategic issues facing the organization in the near and distant future. The role of the environmental audit in strategic planning for public health organizations is discussed by Bryson.[13]

The community nutrition needs assessment focuses on factors and trends related to nutrition risks and needs in the community. As commonly applied, this process examines nutrition needs and resources available to respond to those needs. Community nutrition needs assessments have the disadvantage of focusing on "prescribed needs" based on experts' definitions of optimal nutrition and are limited by the nature of routinely available data. Techniques of market research can be used to supplement the community needs assessment to gain an understanding of potential clients' "felt needs."

Market research that gathers data about potential clients' perceptions of needs and wants improves program planning. Purposefully designed interviews, surveys, focus groups, and observations can be used to gather information that enables the program to be shaped in a way that will be most appealing to the target audience. Market research, described by Kotler,[14] put in the perspective of social marketing by Manoff,[15] or applied to nutrition programs by Helm and Rose,[16] is especially helpful in determining program details. Modifying experts' prescriptions of needs with clients' perceptions of needs and wants leads to programs that are utilized by the target population and are more effective in achieving service and outcome objectives.

Priority setting

Data collection results in considerable understanding of problems. However, the essence of policy planning is prioritization of needs and actions in the face of constraints and uncertainties. Methods of prioritization must be fair, objective, and reflect community values. Methods that involve constituencies affected by the results, such as the nominal group process, have the added benefit of serving as a learning process for participants.[17] Hanlon's four criteria for priority determination are widely used: (1) Size—uses rates of risk and incidence or prevalence rates to compare numbers affected by problems; (2) seriousness—considers what happens if nothing is done based on urgency, severity, economic loss to family and society, and potential for involvement of others; (3) effectiveness of intervention—estimates probability of preventing or reducing the problem based on what is known about the efficacy of available interventions; and (4) political support—considers propriety, economics, acceptability, resources, legality.[17] Spiegel and Hyman summarize other methods of prioritizing problems and actions.[17]

Responding to programmatic priorities with a comprehensive coordinated nutrition system requires a broad, flexible funding base.[18] Funding for nutrition programs should come from several sources. Ideally, state and local tax revenues support an administrative base for nutrition activities. The Maternal and Child Health Block Grant, other federal health funds, Medicaid, private insurers, and voluntary organizations may fund targeted programs and services. Special projects or new innovative interventions may merit foundation or public agency funding (e.g., special projects of regional and national significance [SPRANS]). Financing can be a challenge and is discussed in chapter 13.

Goals and objectives

Goals and objectives express desired results. While goals are general, objectives are specific and measurable. Objectives are quantified in terms of units of measure (e.g., incidence rate, percent change, and number served) and time (e.g., by the end of program year, by the year 2000). *Outcome* objectives, which define desired results, are differentiated from *process* objectives, which express desired program activity and output (e.g., number of clinic visits). Several resources exist to guide establishment of objectives: *Model Standards: A Guide for Community Preventive Health Services*,[19] *Promoting Health/Preventing Disease: Year 2000 Objectives for the Nation*,[3] and *Promoting the Health of Women and Children Through Planning*.[20] Many states have planning guidelines to facilitate collaborative efforts toward a state-wide comprehensive nutrition plan.

Figure 9.2 gives examples of goals and objectives and illustrates the increasing specificity of objectives as one moves down the organizational hierarchy. Experience gained during assessment of progress toward the 1990 Health Objectives for the Nation indicated that not all important goals and objectives are measurable.[9] Yet emerging and complex problems often require priority attention. For important yet difficult-to-measure objectives, desired results and target timelines will be arbitrary and approximate. With greater understanding of the problem, development of indicators, and deliberate information gathering and evaluation, objectives will become more realistic in subsequent planning cycles.

Analysis of alternatives

Policy planning makes a transition to implementation planning at the point at which decisions are made regarding which programs will receive priority. The analysis of alternatives involves consideration of programmatic approaches for moving toward health goals and of specific measurable objectives in light of priori-

Figure 9.2: Hierarchy of goals and objectives

Policy Planning

Nutrition Unit Mission

To assure the provision of quality nutrition services that promote the improvement of nutrition and health of the population through the development of a comprehensive, community-based system of nutrition-related services.

Goal

To increase the proportion of women who initiate breastfeeding to national standards.

Objective

By 1995, the proportion of low-income women who breastfeed their infants will increase from 15 percent in 1989 to 30 percent.

Program Priority

The health department should initiate and take a leadership role in a program of coordinated activities that builds capacity, skill, and motivation within the existing system to promote breastfeeding among low-income women.

Implementation Planning

Outcome Objective

By 1992, the proportion of low-income women who breastfeed their infants will increase from 15 percent in 1989 to 24 percent.

Process Objectives

By 1991, 100 percent of health care professionals of the prenatal care provider network will be exposed to the Breastfeeding Promotion Program.

By 1992, 80 percent of low-income women receiving prenatal care will be exposed to breastfeeding promotion interventions.

Activities/Methods

Establish an interagency breastfeeding promotion committee by February 1.

Develop protocols for breastfeeding education in prenatal visits for pilot-testing by April 1.

Select and/or develop education materials tailored to interests of low-income women by July 1.

Cosponsor a continuing education program for health professionals on breastfeeding by September 30.

Tasks

Interagency Breastfeeding Promotion Committee

1. Identify opinion leaders, experts, lead agencies, and others.
2. Recruit for committee membership.
3. Arrange meeting to share data, engage support, and define committee's role.
4. Build involvement, ownership, and consensus.
5. Et cetera.

ty needs, available resources, and existing constraints.

The analysis requires the following information about each program alternative: (1) development of a clear definition of the technical aspects of the program and its intervention strategies; (2) specification of the organizational framework required; (3) outline of personnel and facilities needed; (4) estimation of costs in financial terms; (5) approximation of the expected results in relation to established priorities; and (6) consideration of other positive and negative impacts. The programs can then be compared. Competing alternatives with high price tags merit the use of sophisticated decision-making procedures to assure objectivity.[21]

Programs vary from being single purpose to being a comprehensive "bundle" of services. They may use simple or complex intervention approaches and may be directed to an individual, a special population group, or the population at large. Comprehensive prenatal care is an example of a bundle of services of which nutrition is one component.

Implementation Planning

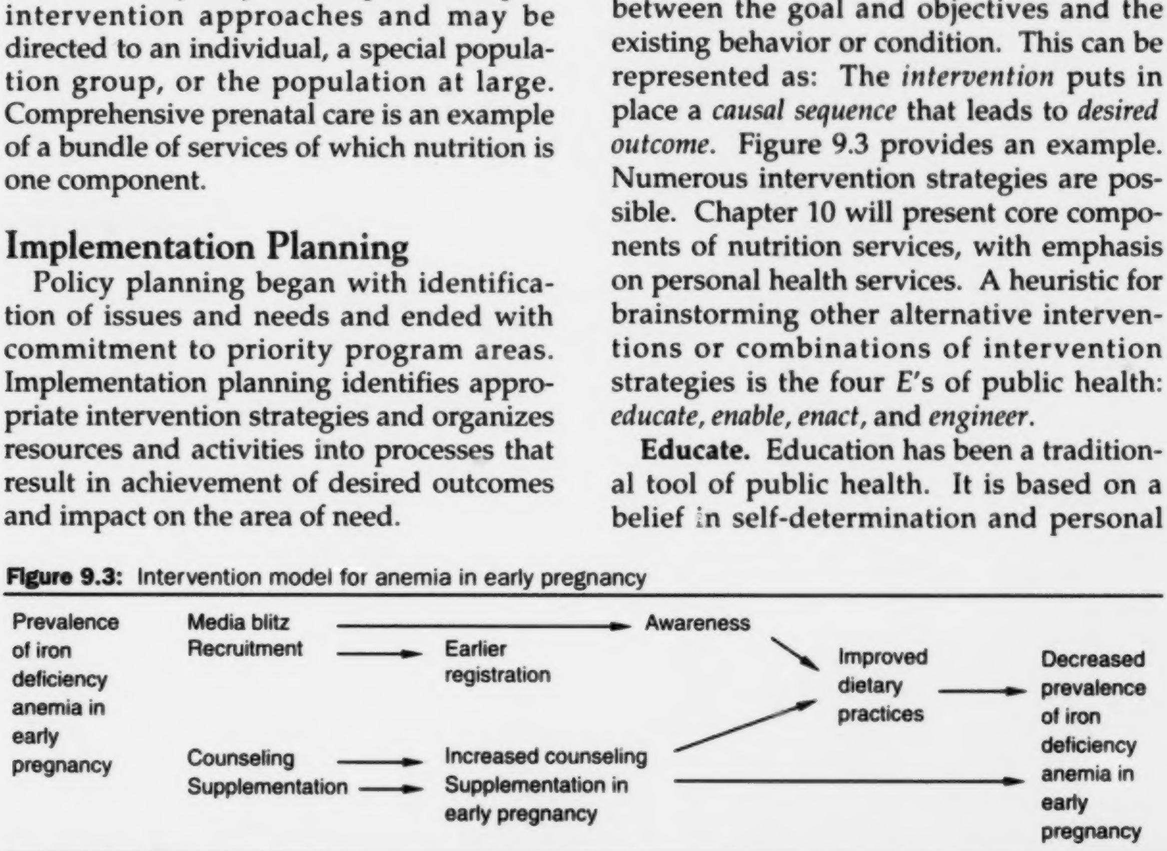
Policy planning began with identification of issues and needs and ended with commitment to priority program areas. Implementation planning identifies appropriate intervention strategies and organizes resources and activities into processes that result in achievement of desired outcomes and impact on the area of need.

Design of interventions

An intervention is a purposefully planned program, activity, policy, or other action that is designed with the intent of changing a behavior, risk factor, environmental condition, or aspect of health status for an individual, target group, or the community at large. It must be built on a model that links an action to the desired change. The model is a statement of the assumptions underlying the design and operation of the program. Assumptions may be drawn from previously tested research and demonstrations or they may be based on unevaluated experience or professional judgment. An intervention model takes the form of a statement(s) about the expected relationship between a program and its desired outcome; it sets forth the strategy for closing the gap between the goal and objectives and the existing behavior or condition. This can be represented as: The *intervention* puts in place a *causal sequence* that leads to *desired outcome*. Figure 9.3 provides an example. Numerous intervention strategies are possible. Chapter 10 will present core components of nutrition services, with emphasis on personal health services. A heuristic for brainstorming other alternative interventions or combinations of intervention strategies is the four *E*'s of public health: *educate, enable, enact,* and *engineer*.

Educate. Education has been a traditional tool of public health. It is based on a belief in self-determination and personal

Figure 9.3: Intervention model for anemia in early pregnancy


Prevalence of iron deficiency anemia in early pregnancy
Media blitz
Recruitment
Awareness
Earlier registration
Improved dietary practices
Decreased prevalence of iron deficiency anemia in early pregnancy
Counseling
Supplementation
Increased counseling
Supplementation in early pregnancy

freedom. Education is designed to increase individuals' awareness and knowledge of options, of benefits of particular options, and of reasons why certain practices relate to good health or well-being. It allows individuals to exercise free choice from a position of being fully informed; however, education can also take the form of persuasion or brainwashing.

Enable. Interventions that reduce social, physical, psychological, or economic barriers to action and make it easier for people to act according to the desired goal, irrespective of their knowledge base, are enablers. For example, food assistance programs assist families in meeting basic nutrition needs, and child care facilities near the workplace enable breastfeeding among working women. Enabling interventions relate to the four *P*'s of the marketing mix (i.e., design of *product* to be culturally acceptable; location of clinic site [*place*] to reduce barriers to access; subsidized services to keep the *price* low; and tailoring of the *promotion* message to enable attention and acceptance).

Enact. Interventions in this category protect society by requiring or prohibiting certain actions through legislation or regulation. Legislative action may be initiated on behalf of vulnerable groups within the society. For example, P.L. 99-457 requires services for handicapped children. Other examples include food safety and labeling regulations, mandated phenylketonuria (PKU) testing, and institutional food codes and nutrition care standards required for licensure.

Engineer. Science and technology can be used to ameliorate problems. Frequently, engineered interventions achieve health goals with no involvement or decision on the part of the individual (e.g., fluoridated water, air bags in automobiles, and vitamin A- and D-fortified milk). Food engineering has responded to the need for lower fat, and higher fiber food products. Social engineering through the use of community development approaches could also be categorized here.

Many programs and services use a combination of these intervention strategies. Case management is required by some funding authorities, and it enables access to and efficient utilization of health resources.[22] Health promotion programs use multiple educating and enabling and social engineering interventions to bring about desired changes.[8, 23] Current discussion regarding food labeling may result in changes in legislation or regulation, leading to either more informative nutrition labels (education) on more foods, thereby allowing informed choice in the grocery store, or to approval of a "good nutrition" symbol that enables selection of nutrient-dense foods.

To achieve goals, interventions must be purposefully designed to attack the problem and its determinants as they are currently understood. Interventions must be matched to the problem, to the target group, and to the community context. Figure 9.4 illustrates a continuum of community-based services according to needs of older adults.[24] Considerable work has been directed to the development of nutrition service models for children with special needs.[25, 26] Models of intervention alternatives need to be developed for other MCH nutrition priority areas. Two important points are made in figure 9.4. First, need expresses itself on a continuum. Cost-effectiveness is achieved by matching type of service to level of need. Second, the system includes providers from numerous public, private, nonprofit, and voluntary organizations, as well as family members. Referral and coordination are important to assure that clients' changing needs are met without duplication and without gaps.

Figure 9.4: Continuum of community-based services

SEMI-DEPENDENCE

FROM INDEPENDENCE ← to → DEPENDENCE

Midlevel Need for Support

Well Elderly ← → Fragile Elderly

Support Self Care in Own Home

Maintain Ability to Live at Home with Help or at Relative's Home

Institutional Care

Food Stamps

Dining Out Programs

Congregate Meal Programs

Expanded Food & Nutrition Education Program

Nutrition Education
- Mass Media
- Senior Centers
- Cooperative Extension

Dial-a-Dietitian

Diet Counseling Services
- Public Health Nutritionists
- Dietitians in Private Practice

Home Health Services with Diet Counseling

Homemaker Services (Assistance with meal preparation)

Home-Delivered Meal Programs

Food Shopping Assistance

Chore Services

Adult Day Care

Food Service and Nutritional Care in:
- Retirement Homes
- Personal Care Homes
- Nursing Homes
  - Intermediate Care Facilities
  - Skilled Nursing Care Facilities

Hospice

State Licensure and Federal Medicare/Medicaid Standards for Food Service and Sanitation and for Meeting Nutritional Needs of Residents

Adapted from: Fanelli, M.T., and Kaufman, M. (1985). Nutrition and older adults. In H.T. Phillips and S.A. Gaylord (Eds.), *Aging and public health*. New York: Springer. Used by permission of Springer Publishing Company, Inc., New York 10012.

Organizing resources and activities

Interventions become viable programs through organization of resources and activities. A realistic budget and a time-sequenced set of activities must be developed concurrently. On one hand, funding groups and agencies are reticent to allocate resources without specific details of operation. On the other hand, specific activities are influenced by the magnitude of resources available.

Budgeting. Resource needs include: personnel, materials (e.g., anthropometric equipment, education tools), and facilities (offices, classrooms, waiting rooms). Capital expenditures have seldom been a consideration for nutrition. Greater attention should be given, however, to construction of appropriate environments for counseling and education that allow for demonstrations and experiential learning consistent with adult education principles.[27]

Activity scheduling. The activities that lead to specified objectives must be identified and organized. A number of methods are available for scheduling activities. A Gantt chart diagrams the standard duration of each activity and the order in which activities need to be carried out. Scheduling charts facilitate monitoring of program implementation.

Beyond schedules of activities, most nutrition interventions require carefully defined protocols, standards of performance, or quality assurance criteria that delineate appropriate processes for the intervention. Quality assurance is discussed in detail in chapter 11.

As activities are outlined, responsibility for their accomplishment must be assigned. Care should be taken to match qualifications and capabilities of personnel with the activities. For some interventions, nutrition personnel are responsible for all activities. Other interventions will use members of the multidisciplinary team, collaborators across agencies, and volunteers. Position descriptions and organizational charts may need to be developed to delineate responsibilities and define working relationships among personnel and collaborating agencies.

Staffing. Activities relating to staffing should be specified in the implementation plan. Galen and Palombo outline staffing guidelines relevant to most nutrition programs.[26] Chapter 12 elaborates levels of public health nutrition personnel and their training. All personnel must be adequately prepared for their responsibilities. Specialized interventions may require procurement of technical assistance or consultation, recruitment of new personnel with needed expertise, and/or in-service training and staff development.

Managing implementation

In addition to assuring that resources are available and that activities and responsibilities are defined, the nutrition program manager must create an environment that fosters good performance. To do so requires application of leadership, organizational behavior, and human resource management skills.[28] Three points will be highlighted here.

Performance and motivation should not be left to chance. In new programs or interventions, training, supervision, coaching, and positive reinforcement should be used to develop skillful performance of new responsibilities. In ongoing programs, and in situations where staff do repetitive tasks, stimulating in-services and opportunities for continuing education and career development are important. In addition, all staff should receive regular feedback on their individual performance as well as on that of the total program.

Employees and collaborators should be involved in decisions that impact them. When symptoms of problems emerge, program staff should participate in exploring the problem and identifying alternative solutions. Their participation in planning and problem solving, and their involvement in determining needed adjustments in the implementation plan, enable ongoing cooperation and motivation.

Milestones in program implementation should be celebrated. Use significant milestones in program implementation and operation to recognize the efforts of those involved. Special events and recognition build program pride and identity among providers, clients, funders, and advocates. These activities are important for sharing credit and building cohesion and renewed commitment to mutual goals. Special events also provide opportunities to inform administrators and funders of program activities and progress, and can be used to increase community visibility.

Management information systems

Effective management requires timely information so problems in resource availability, performance of activities, and volume of services can be identified early and adjustments made. Four kinds of information are needed for management of nutrition programs.

At the patient service level, *case management* requires a system for documenting and tracking patients through an appropriate sequence of service: screening, diagnosis, treatment, and follow-up. Case management information is used for quality assurance audits and is often linked to financial information,[29] and may also be used for efficiency studies.

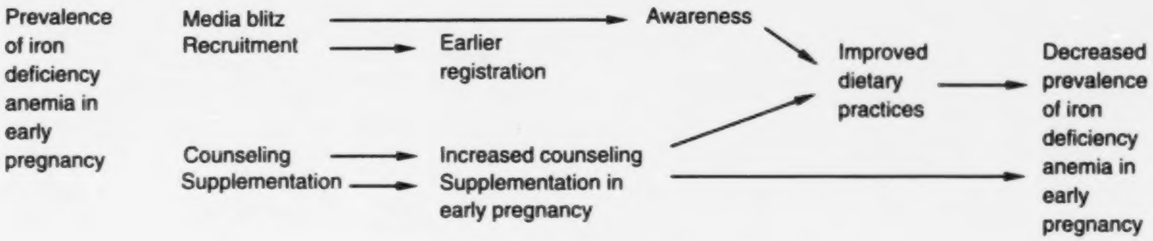
Information needed at the program level includes *financial information*, *service delivery information*, and *evaluation information*. *Financial information* is needed for budgeting, controlling, and reporting expenditures and revenues, and for tracking billing and collections when fees are charged. *Service delivery information* is used to monitor units of service for assessment of service capacity and utilization. It is based on appointment schedules and encounter records, and produces unduplicated head count, service output reports, and descriptive measures of the population served. Service information is often required by administrators and funders, and is generally of interest to advocates and the public. *Evaluation information* is gathered to assess specific indicators of program performance and client outcome in comparison to established internal program objectives, as well as to state and national objectives.

Procedures and data systems, often computerized, which gather and summarize information for management decisions and evaluation, are called management information systems (MIS). In 1985, the Demystifying Data Conference detailed existing data systems and guidelines for establishing them.[9] Successful examples of data systems used at state and local levels illustrated the use of MIS to develop and expand nutrition programs. Peoples-Sheps outlined types of data needed for program monitoring and evaluation.[10] The relationship between data systems, the intervention model, and program plan is shown in figure 9.5. Data systems should be tailored to program and organization needs, as well as to reporting requirements of funders and of state and national nutrition monitoring systems. Standard health and nutrition status indicators that have scientific and practical significance for MCH and nutrition programs should be incorporated into MIS.[9, 10, 19]

The internal data system may be supplemented with external data sets for overall evaluation purposes, such as needs assessment and assessment of progress toward national objectives.

State data systems track information for a number of purposes:[9]

Figure 9.5: Relationship between the intervention model, data systems, and the program plan


Prevalence of iron deficiency anemia in early pregnancy
Media blitz
Recruitment
Counseling
Supplementation
Awareness
Earlier registration
Increased counseling
Supplementation in early pregnancy
Improved dietary practices
Decreased prevalence of iron deficiency anemia in early pregnancy

Types of Data Needed for Program Management and Evaluation

Baseline data	Service statistics	Process evaluation	Outcome evaluation
	# of clients Units of service Quality assurance review Financial records Budget expenditures/ revenues		

Parts of the Program Intervention Plan

Statement of need	Activities/ methods Budget	Process objectives	Evaluation plan	Outcome objectives

1. To identify and track populations and geographic areas in need of services using poor rankings on health status indicators;
2. To document types of services available and how well they are delivered;
3. To determine accessibility and utilization of services by the population at risk;
4. To measure intervening changes in behavior, knowledge, and risk status; and
5. To assess the effectiveness of existing services in improving health status.[9]

The MIS of local health agencies should be designed to contribute data to state and national systems.

Evaluation

Evaluation completes the cycle of the management process. It provides information to guide successive planning cycles. Evaluation activities should have a clear purpose, determined by the stage of development of the program and the needs of the decision-maker. The purpose influences the choice of evaluation method.

Formative evaluation is used to make decisions about the design of the intervention and to refine the program through successive stages of development. Formative evaluation utilizes market research (including focus groups, surveys, interviews, and observation), scientific and technical documents, and new or existing demographic, epidemiologic, and socioeconomic data about the target population. The information is used to develop an intervention model and to design the program and its implementation plan. Guides to formative evaluation are available.[23, 30] Social marketing[14, 15] relies heavily on formative evaluation to develop effective intervention strategies. Formative evaluations address the questions, What should we do? and What is the justification for the approach(es) selected?

Process evaluation is important for documenting that the program is actually being implemented and delivered to the target population as planned. It monitors the progress and quality of implementation activities using financial and program records, and quality assurance and other reviews. Process evaluation is aided by well-designed MIS. Quantitative data should be supplemented with periodic surveys of providers and clients to assess satisfaction with processes and services and to identify potential barriers to successful program operation and accomplishment of objectives. Personnel responsible for implementation should review results of ongoing process evaluation and participate in decisions regarding corrective adjustments. Process evaluation addresses the questions, Are activities on schedule? Is performance up to par? and Are we doing it the right way? Process evaluation is an essential prerequisite to outcome and effectiveness evaluation.

Outcome evaluation compares the results of program participation during a defined period of time with the specific, measurable outcome objectives that were established. It answers the question, Did we achieve what we set out to achieve? The greatest challenge to outcome evaluation is tracking clients after their involvement with the program so that outcome indicators can be measured.

Effectiveness evaluation is actually a test of the intervention model. It attempts to verify the assumption that the program/intervention did put in place a causal sequence that led to the desired outcome. Effectiveness evaluation requires concrete definition of indicators of effect (dependent variables) and possible confounding or intervening variables; it requires comparison groups who did not receive the program or who received a different form of intervention; and it is concerned about alternative explanations for effects experienced by program participants.[31] Effectiveness evaluations use a quasi-experimental design to control for the threats to internal validity.[32] Dodds has outlined the selection of and the application of quasi-experimental evaluation designs to nutrition programs.[26] Effectiveness evaluation asks, "Is the nutrition program *responsible* for the effect?

Economic evaluation considers the tradeoff of resources consumed and the resulting consequences. There are several types of economic evaluation.[33] *Cost analysis* is a description of the costs required to deliver the program. *Cost comparisons* examine alternative resource combinations, usually seeking the lowest cost alternative for a specific activity. *Cost-effectiveness analysis* links cost analysis with effectiveness evaluation to compare costs per unit of effect (e.g., $15,000/low birthweight infant averted).

Cost-benefit analysis translates effects into monetary units and reports net benefits (or net costs) to society, or expresses costs and benefits as a ratio (e.g., the cost-benefit ratio for the Special Supplemental Food Program for Women, Infants, and Children [WIC] has been reported as 1:3). *Cost-utility analysis* evaluates alternatives in terms of their costs and the estimated utility (or value) of the outcomes. Cost-utility analysis is used when program outcomes are of a nature that do not lend themselves to quantification and when the assessment of outcomes is subjective. All economic evaluations answer the question, Are we getting our money's worth?

Goal-free evaluation is a comprehensive examination of a program and its costs and consequences, both positive and negative, as seen by clients, providers, external stakeholders, and society.[34] Goal-free evaluation is especially important for policy decisions, and is often carried out by outside evaluators. It is most commonly used for mature programs when reauthorization decisions are pending, and at times of agency reorganization and/or priority setting. Goal-free evaluation is closely aligned with policy analysis, in which a broad range of criteria are examined, including ethical and equity considerations.[35] While other evaluation methods tend to accept the existence of a program as a given, goal-free evaluation asks, Is this really what we should be doing? How much of it should we be doing? and How does the program impact on other aspects of the organization, providers, clients, and society? Goal-free evaluation uses available process and outcome evaluation results, but through interviewing and other methods develops a much broader description of the program and its consequences. Goal-free evaluation draws heavily on the views of the broad constituency to develop a picture of a program's processes and practices, and its direct and indirect consequences.

Nutrition programs should be subjected to goal-free evaluation more often. It forces examination of accepted assumptions about programs, opens programs to wider scrutiny and wider visibility, and facilitates access to the advice of a range of experts. This can be a beneficial process which may lead to broader program support, modernization of assumptions and intervention strategies, authorization of needed resources, and/or allocation of resources to more important or more effective programs. By using goal-free evaluation, nutritionists will be better equipped to integrate nutrition priorities and programs into existing priorities of the health agency and collaborating agencies.

Challenges for Today and the Future

Policy planning identifies priority areas of need and establishes an organizational commitment to act on them. Implementation planning results in the design of intervention strategies expected to be effective because of their bases in science and market research. Implementation plans outline a process to assure the delivery of services that meet established standards of care and that reach and meet the needs of the target population. These plans establish benchmarks for evaluation.

Good plans lead to successful implementation and result in change. If no change results from planning efforts, then either the environment is stable and planning cycles are more frequent than necessary, or nutritionists are blindly perpetuating the status quo. Nutrition leadership means using nutrition interventions as a tool for deliberate change.

By staying informed of emerging social trends, health needs, and the priorities of constituencies, and by exercising leadership, nutritionists can integrate the nutrition-related needs of mothers and children into policy priorities of state and local health departments and other public, private, and voluntary agencies. Nutritionists must recognize the policy aspects of planning and become visible participants in health agency, MCH, and Crippled Children Services (CCS) programs, and in community-wide planning efforts. It will not be enough to skillfully plan and manage specific nutrition programs. Meaningful change will come with involvement at higher, broader levels, followed by carefully designed interventions and sound implementation plans.

The challenges of the new decade open doors to innovative intervention strategies. Not all nutrition problems of mothers and children should be viewed as medical problems. For many problems and their determinants, community-based interventions drawn from the four *E*'s—*educate, enable, enact*, and *engineer*—could have greater effect on larger numbers over time. However, screening, diagnosis, and treatment of individuals at risk will continue to have an important place in the comprehensive nutrition system.

Comprehensive nutrition planning must draw on common goals of numerous constituencies in public, private, and voluntary sectors. Collaboration throughout the community should include business and industry, education, social services, child care, religious organizations, and the media, as well as traditional collaborators in voluntary agencies, health care, and food delivery and assistance systems. Expanded collaboration can assure access to nutrition services for at-risk mothers and children and lead to innovative programming in prevention and health promotion for all mothers and children.

Participative planning is also necessary for success at the implementation level. Involvement of providers, advocates, funders, and representatives from the target population in planning intervention strategies and implementation activities builds consensus and commitment, and results in workable plans. Formative and process evaluation relies on inputs from many so that adjustments in program delivery can be made to assure accomplishment of goals and objectives. Collaboration is essential throughout all phases of planning, implementation, and evaluation.

Throughout this chapter, the importance of nutritionists' involvement at the policy level was stressed. Nutritionists must look at the broad picture, being aware of emerging trends and renewed definitions of public health's responsibilities, to assess needs and opportunities in the environment, to participate in the policy process, and to assure that a comprehensive system of nutrition services is available to meet nutrition-related needs of mothers and children.

Issues and Recommendations

Issue #1. Public health nutritionists as participants in policy level planning.

Priorities are established and major resource commitments are made at the level of policy planning. For greater impact, nutrition-related needs must be integrated into policy priorities of state and local health departments and other public, private, and voluntary agencies. This is more likely to happen when nutritionists are involved in policy planning.

To effectively participate in policy-level planning, in addition to technical knowledge of nutrition, nutritionists need knowledge of the effectiveness of nutrition interventions as well as knowledge of the broader issues in the health, social, and economic environment. Nutritionists also need political skills to communicate, negotiate, and advocate for the inclusion of nutrition-related initiatives in the policy agenda.

Recommendation. Public health nutritionists must take seriously their responsibility for policy making. Understanding of the political nature of organizations and development of skills to participate effectively in policy development and implementation should be priority areas for continuing education and training of public health nutritionists.

Issue #2. Public health nutritionists as architects of the future.

Nutritionists have historically been very good at program-level planning and implementation. However, innovation in both design of intervention strategies and methods of program delivery is required due to expanded understanding of nutrition-disease relationships and methods of individual and community change, along with constraints on funding.

Nutrition leaders must break from the patterns of the past and become architects of the future. They must be encouraged and empowered to think creatively, to venture into new collaborative relationships, and to take risks.

Recommendation. Public health nutritionists, or at least a subgroup of leader-change agents within the public health nutrition community, must think futuristically. Innovation and change must be embraced as friends and as opportunities for greater impact in the future; innovation and change should not be viewed as enemies and as threats to nutrition program survival or viability. Creative exploration of future needs and innovative interventions should be encouraged through funding of think-tank-type conferences and retreats. Innovative intervention strategies and alternative program delivery methods must be supported through demonstration project funding.

Issue #3. Appropriate evaluation methods.

Evaluation should be ongoing, but different methodologies must be used for various program planning, program control, and policy-making purposes. Public health nutritionists need greater skill in developing and using evaluation methods tailored to specific management purposes, as described in the evaluation section of this chapter.

Recommendation. Greater attention should be directed to the selection and application of appropriate evaluation methods in ongoing and specially funded MCH nutrition projects. Funds should be earmarked for the development and testing of evaluation models for various purposes. This should be followed by training in evaluation methods for nutritionists with responsibilities for program management. In addition, evaluation methods should receive greater attention in graduate education of public health nutritionists.

Issue #4. Management information systems.

Credible participation at the policy planning table and routine modification of programs to improve effectiveness and efficiency require access to sound information on (1) nutrition needs, (2) nutrition service delivery, including capacity, accessibility, and utilization for the general and target population, and (3) effectiveness of nutrition programs and services in terms of impact on knowledge, behavior, and health status outcomes.

Recommendation. Resources should be made available to support the development of uniform management information systems that collect and summarize nutrition program data. This should include case management, financial, service delivery, and evaluation information. Passage and implementation of the Nutrition

Monitoring System will fill part of this need; however, local and state agencies will need management information systems more finely tuned to short and long-range planning, implementation, and evaluation decisions.

Issue #5. Time and resources for planning and evaluation.

Sufficient time and resources must be allocated so that managers of nutrition programs and services can fully carry out planning and evaluation responsibilities. These management processes cycle into each other with good evaluation data feeding into sound planning, which leads to identification and justification of future priorities, funding, and program implementation.

Recommendation. Plans and budgets for all nutrition programs should reflect allocation of sufficient staff time and other necessary resources for planning and evaluation activities. Plans should address the development and/or utilization of management information systems and evaluation methods.

Conclusion

Addressing these issues will enable public health nutritionists to create a vision of comprehensive, community-based, family-centered services that can make a difference for mothers and children; to instill that vision in others, particularly policymakers; and to bring the vision to reality through implementation of innovative, effective, and efficient nutrition programs.

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Components of Nutrition Services

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The importance of nutrition services in perinatal care is recognized in guidelines recently prepared by the American Academy of Pediatrics and the American College of Obstetricians and Gynecologists.[1] Copies of the guidelines have been provided to each member of the two professional organizations. Nutrition services are discussed in several sections of the guidelines, from preconceptional care to prenatal care and care of the newborn. In addition, one chapter concentrates on maternal and newborn nutrition. Registered dietitians and nutritionists are recognized as professionals able to counsel patients at nutrition risk, and would be desirable personnel at each perinatal care center. It is recommended that "a minimum of one registered dietitian/ nutritionist who has special training in perinatal nutrition and can plan diets that meet the special needs of high-risk mothers and neonates" be available in the perinatal care service of levels II and III hospitals.[1]

Nutrition services are well integrated into the recommendations for total care in the report by the Public Health Service Expert Panel on the Content of Prenatal Care.[2] As stated in the foreword, "This report goes well beyond all others by examining in detail the components of prenatal care and the timing and frequency of their delivery."

A guide for the primary care practitioner, developed by the Penn-sylvania Department of Health,[3] is an example of how a state agency has emphasized the inclusion of nutrition services as an important part of com-prehensive perinatal care. Health implications related to nutrition are included, along with details of the components of nutrition services which should be provided.

"The primary goal of a nutrition service is to improve the nutritional status of a patient or client in ways that ultimately enhance the health and well being of that individual."[4]

There are specific components of nutrition services that need to be carried out in a systematic manner in all health care programs in order to achieve the stated goal. These components are described in *Guide for Developing Nutrition Services in Community Health Programs* (pp. 1–2) as:

1. Screening for nutrition problems.
2. Assessment of nutrition status of individuals, including:
   - Evaluation of dietary practices as related to cultural and socioeconomic factors and food supply;
   - Biochemical measurements of nutrients in body fluids and tissues; and
   - Clinical examination including assessment of growth.
3. Planning and implementation of nutrition care for individuals; anticipatory guidance; and assistance with nutrition and diet problems, including:
   - Individual and group counseling to meet normal and therapeutic dietary needs.
   - An effective nutrition education program which is responsive to consumer beliefs, attitudes, environmental influences, and under-standings about food.
   - Provision of, or referral to, community food assistance resources—supplemental food programs for high-risk groups such as pregnant women and

infants, food stamps, and child nutrition services such as school lunch and breakfast programs, child day care feeding, and other emergency food programs.[5]

Screening and Assessment to Identify the Problem

"In planning health care delivery, it is important to identify the nature and extent of common health problems, including nutrition problems. Screening represents only one aspect of total assessment of health. In many situations, limitations in manpower and funds prevent thorough nutrition assessment of all individuals seeking care. Screening is therefore essential. Screening for nutrition status is the process by which various parameters are evaluated in groups of individuals for the purpose of identifying those likely to be at great risk. Once individuals have been identified, a more thorough evaluation (assessment of nutrition status) is carried out. Knowledge of the frequency and severity of problems of patients and families presenting themselves for care will permit reasonable allocation of resources for solving the more important nutrition problems. For this reason, some screening for nutrition disorders should be carried out in every health care delivery system" (p. 12).[5]

Even a minimal screening program requires information on individuals' food intake practices, physical findings (including anthropometric measurements), and a few laboratory analyses. Figure 10.1 summarizes the screening and assessment process.

The Division of Nutrition, Centers for Disease Control (CDC), serves as a resource for monitoring and assisting with the improvement of nutrition assessment and monitoring of certain populations of high-risk pregnant women, infants, and children. Three programs in the CDC Division of Nutrition, the Pediatric Nutrition Surveillance System (PedNSS), the Pregnancy Surveillance System (PNSS), and the Severe Pediatric Undernutrition Surveillance Systems (SPUN), receive data from states, summarize data, and return reports to states.[6, 7] At present, data are mainly from laboratory determinations and physical findings collected routinely in health, nutrition, and food assistance programs. Technical assistance, consul-tation, and training are available to states for the collection, processing, analysis, and interpretation and application of data. Software for use in mainframe and personal computers is now available from the CDC for states to use in independently analyzing data in a more timely manner.

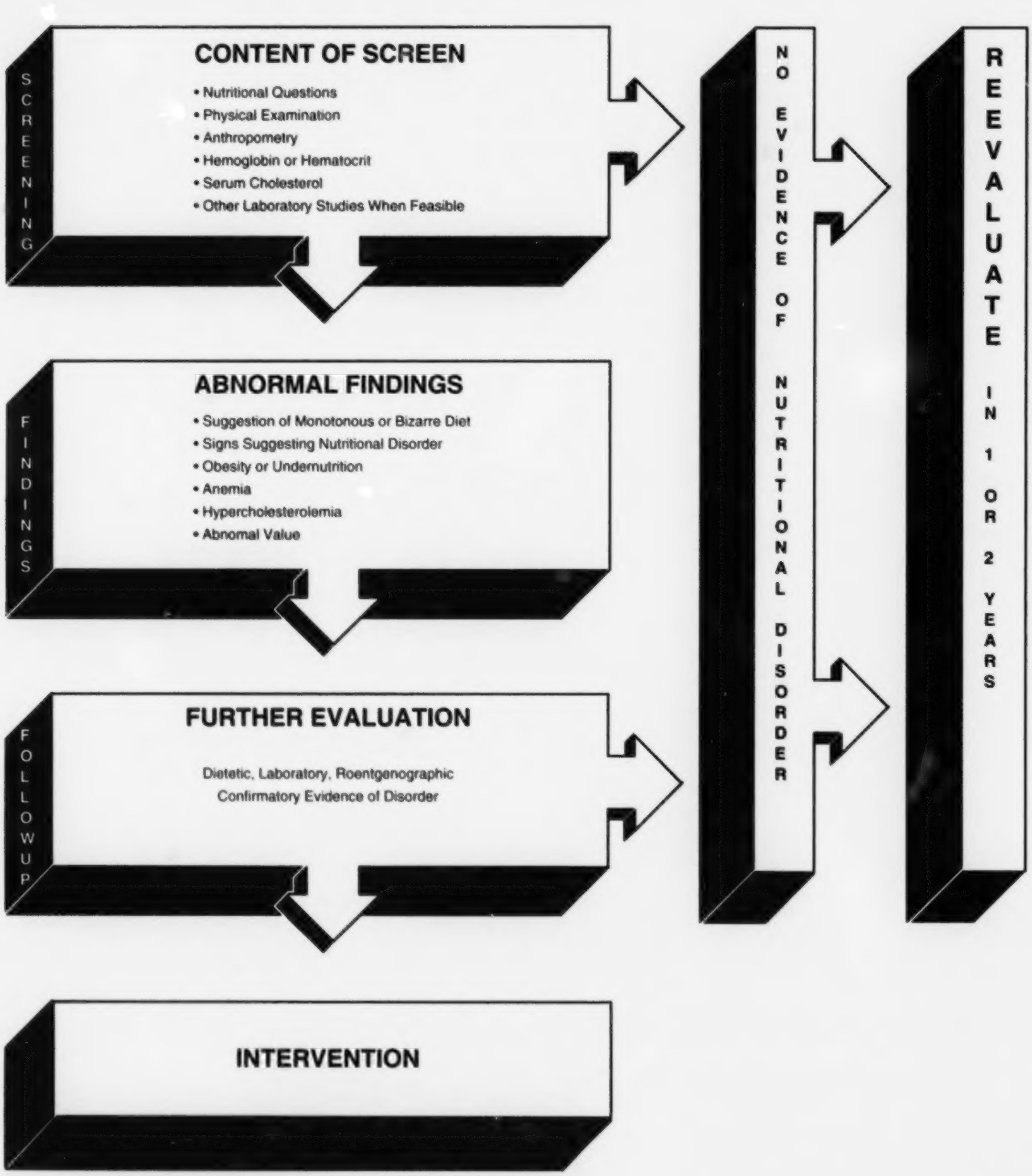
Not all states participate in the CDC Division of Nutrition PedNSS and PNSS at this time, and data are not collected from all high-risk individuals within a state. The number of data items collected is expanding but does not yet include data related to intervention and linkages with outcome. Usefulness and limitations of reports from the surveillance programs will depend upon completeness of coverage of individuals at risk and upon quality and comprehensiveness of data collected.

Prevention, Treatment, and Follow-up Services in Nutrition

Nutrition counseling

If results of screening or assessment suggest that eating habits are unusual or inadequate, or if the individual presents with a condition which requires dietary modification, counseling is indicated.[2] Nutrition counseling has been defined as "personalized instruction on food selection and for therapeutic diets with the intent of changing behavior to make choices that improve

Figure 10.1: Nutrition screening and assessment process


SCREENING
CONTENT OF SCREEN
• Nutritional Questions
• Physical Examination
• Anthropometry
• Hemoglobin or Hematocrit
• Serum Cholesterol
• Other Laboratory Studies When Feasible
FINDINGS
ABNORMAL FINDINGS
• Suggestion of Monotonous or Bizarre Diet
• Signs Suggesting Nutritional Disorder
• Obesity or Undernutrition
• Anemia
• Hypercholesterolemia
• Abnomal Value
FOLLOWUP
FURTHER EVALUATION
Dietetic, Laboratory, Roentgenographic
Confirmatory Evidence of Disorder
INTERVENTION
NO EVIDENCE OF NUTRITIONAL DISORDER
REEVALUATE IN 1 OR 2 YEARS

Source: S. J. Fomon. (1976). *Nutritional disorders of children: Screening, followup, prevention.* Rockville, MD: U.S. Department of Health, Education, and Welfare, Public Health Service, Health Services Administration.

health and/or prevent disease. Nutrition counseling should be provided only by persons qualified to give expert professional advice."[8]

Nutrition counseling in order to improve health and/or prevent disease may be carried out by any member of the health team who is competent in the counseling process and who is knowledgeable about food choices which are desirable for, acceptable to, and available to the particular individual being considered. Protocols for the management of nutrition problems or conditions (e.g., iron deficiency, diabetes, or weight gain in pregnancy) should be developed and used as guidelines for information provided in counseling. It is important that all members of the health care team be consistent in giving information about food and nutrition to clients.

Recent emphasis on the process of nutrition counseling has resulted in the development of audiovisual materials, manuals, books, and other published materials for use in the development of counseling skills by health professionals.[9, 10, 11] Nutrition counseling has also been emphasized in continuing education activities. Guidelines for nutrition services developed in state health agencies may include practical how-to information about nutrition counseling. An example is the manual developed by nutritionists in the Texas Department of Health.[12]

Many health care programs do not have nutrition counseling available within their own settings, and more must be done to improve the availability and accessibility of such counseling, particularly for the maternal and child population. Referral to the Special Supplemental Food Program for Women, Infants, and Children (WIC) is frequently relied upon for nutrition services. The WIC program is prepared to screen for nutrition risk factors established as criteria for eligibility to the program, but not to carry out further in-depth assessment if needed or to pay for vitamin/mineral supplements other than food. Nutrition education is provided, but only those individuals eligible for WIC receive the educational programs. Limited, if any, personalized nutrition counseling is possible in many WIC programs.

Nutrition counseling is generally not available within the private health care setting, although there have been some instances in which private practitioners have employed registered dietitians as members of the health care team. The more usual practice is referral elsewhere for counseling. Health insurance usually does not include payment for nutrition counseling, with the result that only those individuals who are able to pay receive counseling. Additionally, it may be difficult to integrate nutrition counseling into total health care when the counselor is separate from other health team members.

Some states have found ways to provide nutrition counseling in maternal and child health programs. In South Carolina, for example, nutrition services are provided for all women in the High Risk Channeling Project. Nutrition services include an initial assessment, with follow-up as indicated. These services are reimbursable by Medicaid.[13] The Kentucky Department for Health Services funds positions for nutritionists from their MCH Block Grant. As of November 1989, 27 nutritionists were employed to provide counseling for high-risk individuals in local maternal and child health care programs in 102 out of 120 counties in Kentucky.[14]

Recording nutrition services

It is important to record pertinent information from the counseling session in the client's medical record, along with information from anthropometric measurements, laboratory determinations, and the physical examination. Information recorded should include findings, implementation of care based on findings, and plans for follow-up. Carefully documented records allow for monitoring clients' health care, communicating clients' health care needs to the health care team, and assessing quality of care. The method of recording nutrition services must be geared to the system used in the health care setting.[5]

Systems for documenting all components of nutrition services (particularly education and counseling) in health records in a manner that is workable in the health care setting and easily accessible to monitor and assess the quality of care are lacking in many health care settings. Precise documentation of services in ways that can be linked to changes in health outcomes which are measurable in monetary terms are needed in order to demonstrate the value of nutrition services in health care.[15] One system of recording which has many advantages is used in the San Bernardino County Health Department.[16] Nutritionists and public health nurses worked together to develop a new system of nutrition assessment and case management. The system has a number of advantages, several of which relate to recording: (1) decrease in charting time, (2) precise documentation, (3) computer adaptability, and (4) easy accessibility for quality assurance audits.

Nutrition education

Nutrition education should be an integral part of comprehensive health services and should build on basic nutrition education provided through curricula from preschool through secondary levels and in community settings. In a policy statement of the American Dietetic Association, nutrition education was defined as "the process by which nutrition information and beliefs, attitudes, and environmental influences about food lead to practices that are scientifically sound, practical, and consistent with individual needs and available food resources."[8] The focus of nutrition education varies from anticipatory guidance to changes in food practices needed to alleviate health problems. Individuals and target groups identify health and nutrition topics about which information is desired and assist in planning the structure for delivery so that participation is enhanced. Delivery methods may be one-to-one or involve group settings. Carefully selected audiovisual aids and other instructional materials appropriate to the life-styles of the clients reinforce the message presented.

"Nutrition education should be included in all types of health delivery systems, being structured and implemented through a framework that: assesses *needs*, states *objectives*, determines *content*, selects *techniques*, and evaluates *progress*.

"A health delivery program can develop its proper role of leadership in nutrition education by starting with the problems, not only as they are, but also as the people perceive them and understand their significance; building upon all that is good in current practices; establishing realistic goals cooperatively with the people concerned; focusing on specific problems, one at a time; allowing for decisions for action to be made by the individuals; evaluating progress and making decisions for continuation or change in practice in consultation with the individuals involved. The goal of nutrition education is the acquisition of knowledge as the foundation for making wise food choices and the acceptance of the need for change in eating behavior when nutritional problems exist" (p. 16).[5]

A report from a national conference on nutrition education in 1979 identified some of the issues related to nutrition education for pregnant women, children, and adolescents.[17] Recommendations were made by a task force for solutions to the problems identified as well as the emerging needs of the 1980s. Some of these issues were addressed during the decade, but they should be reviewed in preparation for the 1990s.

The nutrition objectives for the nation have been proposed as a focus for nutrition education.[18] In the 1990 Health Objectives for the Nation, the emphasis included maternal and child health and the application of the USDA/DHHS Dietary Guidelines. Also given priority for 1990 were nutrition education and counseling in routine health contacts. With new priorities established for the year 2000, strategies for nutrition education needed to achieve these objectives demand attention.

The increase of women in the labor force, including those with young children, and the growth of worksite health promotion have implications for nutrition education. Some companies have included components for pregnant and lactating women (e.g., breastfeeding promotion and prenatal education programs).[19] Guidelines for planning and presenting nutrition education at the worksite are available.[20, 21]

Gillespie and Yarbrough[22-24] have applied communication theory to assist nutrition educators in understanding their audience and influencing people's knowledge, attitudes, and behavior regarding nutrition. The difficult and slow process of changing behavior requires the delivery of many messages over a long period of time. Whenever possible, interpersonal (face-to-face) channels of communication and mass channels should be linked. Information sources vary by stage of the adoption process. Mass media are most effective in developing awareness and interest, while friends and neighbors are most influential in the evaluation, trial, and adoption stages of change. In all stages of the adoption process, the professional is less influential than are other information sources. Group approaches that provide for exchange of ideas among peers provide appropriate sources. Efforts to increase breastfeeding have included mother-to-mother telephone linkage as a supportive activity. Recognition and use of techniques appropriate to the stage of the adoption process enhance behavioral change.

"Evaluation of nutrition education should receive more emphasis."[17] This recommendation from the 1979 Nutrition Education Conference was followed in the 1980s. One example of models for evaluation which was published recently[25] was based on an evaluation design developed for a nutrition education course, "Better Eating for Better Health," sponsored by the American Red Cross. To facilitate evaluation, nutritionists need more training in evaluation. Professional groups need to develop tools which can be used for program evaluation.

Mobilizing community resources for nutrition and food assistance

"The health provider should keep updated information about current community resources that could be utilized to improve diets of individuals and families, including who administers such programs in the community. Agreements of understanding for a mode of referral should be made" (p. 17).[5]

Some voluntary health organizations, such as local chapters of the American Heart Association and the American Red Cross, provide classes that are helpful to particular groups. The course "Better Eating for Better Health," sponsored by the American Red Cross, is designed to help implement the Dietary Guidelines. Knowing the schedules for classes available in a community and making appropriate referrals supports interagency cooperation.

Using appropriate educational materials available on a national basis is helpful in several ways. It saves time in preparing teaching materials, provides continuity for a mobile population, and suggests approaches which have been successful in a variety of situations. The March of Dimes Birth Defects Foundation and the National Center for Education in Maternal and Child Health are examples of sources of appropriate nutrition education aids.

In addition to food assistance programs supported by the U.S. Department of Agriculture, such as the Food Stamp Program and WIC, there has been an increasing need and demand for emergency food assistance or private food assistance supported by community organizations. Expansion of services provided by food pantries, food banks, shelters for the homeless (including many families), and soup kitchens has been necessary. The need for community-wide coordinated systems to optimize these resources has grown. An example of one such system can be found in New York.

Since 1984, New York State has funded a Supplemental Nutrition Assistance Program (SNAP) to address a perceived need for food in vulnerable populations. Program funds have been channeled through the existing network of emergency food relief programs. The Nutrition Surveillance Program within the New York State Department of Health has been designed to provide decision-makers at local and state levels with information to assist in the development of policies and strategies to address the problem of hunger in New York State.[26]

Concurrently, the New York State Department of Health contracted for five research projects to study private food assistance programs operated in local communities throughout the state in the mid-1980s.[27] What has been learned in this research has implications for New York State and possibly for other states:

1. A diverse group of people use private food assistance, including a substantial number of children and families. Some are homeless, but the majority are not. Any age-targeted program will only partially solve the problem.
2. The use of private food systems recurs and is not usually an isolated short-term emergency situation.
3. There is great variability in food assistance programs across the state, and many of the programs find it difficult to find adequate resources to meet their needs.
4. Although essentially a voluntary effort, the government has a considerable, but geographically unequal, involvement in the effort. Public funds assist in meeting the food needs not being met, or being met inadequately by government programs.

This study documented that the growth in private assistance programs occurred at the same time as the economic well-being of many low-income people declined, as evidenced by increases in the cost of essential goods, decreased value of the minimum wages, and changes in the coverage and benefit levels of social assistance programs.[27]

Meeting the challenges of food availability involves a variety of approaches to the symptoms of the problem as well as the problem itself. These approaches include employment opportunities, wage and education policies, and social assistance programs; reduced costs in housing and health care; and increased access to the regular food system through adjustment to the Food Stamp Program.

Coordination and referral system

"The program administrator (who may be a single provider) has the major responsibility, working with the nutritionist, to develop an effective system of *coordination* to strengthen nutrition services and prevent duplication and conflicting information. For example, the content of educational and therapeutic guidelines for nutrition services should be agreed upon so that patients are not confused and action is consistent.

"In implementing nutrition services, cooperation, coordination, and referral between individuals, agencies, and groups involved in all levels of care—primary, secondary, tertiary—such as the following are important:

- Nutrition personnel of State and local health agencies and special projects. By maintaining close working relationships with one another, it will be possible to share information and coordinate goals, objectives, program plans, standards, and criteria for service.
- Nutritionists and other personnel in nonhealth agencies such as the welfare department, extension service, or homemaker service agency. Such agencies have educational or service programs which will be supportive of health care plans for individuals and families in areas such as food marketing, menu planning, food preparation, and home management.
- Nutritionists and dietitians in ambulatory health programs, treatment centers, and other group care facilities. Linkage with treatment centers is necessary for appropriate follow-up of patients on special dietary regimes who return to the home community.
- Nutritionists and other health care providers within the program. An organized system of interdisciplinary referral for nutrition counseling is essential even in a small project, and procedures for referral between the nutritionist and the physician, nurse, and other health workers should be established.

"*Referral* procedures are essential for continuity of care and for maximization of services available from other resources. Jointly agreed upon plans for organized procedures should be made for referral and for monitoring progress" (pp. 17–18).[5]

An example of a program which recognized the need for coordination and referral is the Early Nutrition Intervention for Low Birthweight Infants Program, which has been organized in the Trident District in South Carolina.[13] A referral system between the Medical University Hospital Neonatal Intensive Care Unit, the liaison nurse from the Charleston County Health Department (CCHD), the nutrition staff of CCHD in three counties, and the staff of the High Risk Channeling Project has been defined. The neonatal unit refers WIC-eligible infants to the low birthweight (LBW) nutritionist at the CCHD before discharge. The LBW nutritionist makes referrals to appropriate community resources after a nutrition plan has been developed.

Failure to provide appropriate procedures for referral leads to loss of service or duplication of effort. For example, when the health record is not available, rescreening is necessary to authorize participation in the WIC program.

Additional examples of efforts to improve coordination and referral systems have resulted from P.L. 99-457. One of the key components of P.L. 99-457 is that each state's governor must appoint an interagency coordinating council to assist with developing and implementing early intervention services for children with special health care needs. Conferences held in Alabama and Texas helped to increase communication among working committees from pertinent agencies who recognized the lack of interagency coordination.[28] In a Mississippi Title V special project of regional and national significance (SPRANS) to develop a case management and family support system, the nutritionist fosters inter- and intra-agency cooperation and develops the linkages necessary to assure continuity and consistency of nutrition care for children with special needs.[28]

An example of a community-wide coordination and referral system is Emergency Food Helpers (EFH) of Knox County, which was begun in 1980.[29] EFH has grown and now includes 155 groups from churches, government agencies and programs (including the local health department and the WIC program), neighborhood centers, private groups and agencies, groups serving the homeless, and the local food bank. Staff support has been provided by the Community Action Committee's (CAC) Food and Nutrition staff. Member groups make a voluntary annual donation of $10 to defray some administrative expenses, but most of the operating funds of the largely voluntary group come from the Community Services Block Grant.

The partnership of EFH has become an effective coordinating body for expanding emergency food assistance as needs have increased. Creation and continuous support of the Southern Appalachian Food Bank and food drives have expanded resources. Federal Emergency Management Agency allocations for emergency food have also been handled by EFH. The local Cooperative Extension agent developed a standard three-day food bag, and the Knox County General Assistance office developed a computerized "clearinghouse" record system to help target food to those most in need. The EFH, coordinating with the Knoxville Coalition for the Homeless, CAC, Knoxville Utility Board, and Food Policy Council, helped to deal more effectively on a community-wide basis with the interrelated needs of low-income persons concerning homelessness, medical costs, and aid for rent and utilities. Another service has been the production of the *Emergency Food Helpers Directory* as a resource for those working with emergency food. Concern for long-term solutions to hunger has led to advocacy for public policies that help eliminate the causes of hunger.

Assessing Quality Nutrition Services

Assessment of the quality of nutrition services falls into three distinct categories: structure, process, and outcome. How these elements of quality assurance are integrated into nutrition programs will be addressed in the following chapter.

Evaluating the effectiveness of interventions involves both external and internal assessment. A comparison of these approaches appears in *Guide for Developing Nutrition Services in Community Health Programs:*

"*External* assessment involves bringing in 'experts' from outside a practice or project to interview, observe, and examine medical records. The experts then make judgments about the effectiveness of patient services based either on their overall impression about the quality of care (implicit judgement) or on specific, well-defined criteria (explicit judgment). External assessment is the usual model for research into quality of care and has also been used as a mechanism for improving patient services. The problem with external assessment may include such factors as: (1) it is costly, (2) it is often difficult to have reproducible results where implicit judgments are made, (3) the criteria used by the evaluators may not be shared by providers, (4) it may be disruptive to the program, and (5) there is limited evidence that it is effective in altering the way patient care is provided, e.g., identified deficiencies are not corrected.

"*Internal* assessment means that criteria and standards are developed by those actually responsible for providing care, with agreement on what good care should be. These same individuals assess the actual care provided by one another usually using the medical record as a basis. Limited evidence suggests that internal assessment is much more effective than external in actually changing the way care is provided since it is the direct responsibility of those providing care and is *integrated* into the day-by-day operation of the program. Internal assessment involves five basic steps:

1. The goals of the practice are defined and problem areas for quality improvement are selected.
2. Standards of criteria for those problem areas are developed.
3. The care provided is completely documented in the patient record.
4. The care provided is reviewed and compared against the standard to identify deficiencies of care.
5. Steps are taken to correct the detected deficiencies for the individual patients whose records were reviewed and for subsequent patients.

The problem-oriented record, or a record system which documents the process of care with equal effectiveness, is considered by many to be a precondition for effective internal assessment. Otherwise, it may be the quality of the record, rather than the care, which is at issue.

"In terms of assessing quality of care for specific nutritional problems, the steps to be taken should follow easily. The historical, physical, dietary, and laboratory information needed to make an assessment of the nature of the problem can usually be defined readily with little difference of opinion. Together these provide the data base for considering the nutritional problem. In comprehensive care, many of the elements considered desirable for a nutritional data base will be collected routinely on all patients as part of their general data base. The adequacy of the data base can be readily defined from examination of the patient record and comparison with the criteria which have been agreed upon. Where problems are nutritional, such as obesity, the process of care can be assessed by means of proximate outcomes (weight, skin fold thickness) over time, assuming that an adequate data base has been collected. Where problems overlap between nutrition and other provider areas (such as diabetes), the data base is still readily defined and the plan for management usually follows naturally. Assessing the proximate outcome in these instances, however (such as blood sugar), may involve an assessment of the efforts of several providers, rather than just those responsible for nutritional advice, and so it is the patient care which is the focus. When deficiencies are found, it is then the responsibility of all the providers involved to examine their process of care and toget-her work toward making changes to im-prove the care of the patient" (pp. 19–21).[5]

Although progress in quality assurance or quality improvement was made in the 1980s, defining indicators of the quality of nutrition services remains an issue for the present and future. *Guide to Quality Assurance in Ambulatory Nutrition Care,*[30] published in 1983, was the outcome of a series of state, regional, and national workshops and field tests designed to suggest approaches for the improvement of nutrition services. Criteria in this document served as models for the development of guidelines for assessing the quality of structure, process, and outcome of nutrition services which have been developed by various agencies and organizations. Some examples of guidelines for nutrition services and procedures to improve service delivery are: (1) workshops to develop competency-based skills that improve accuracy and consistency in delivery of nutrition services,[31] (2) guidelines for nutrition practices,[32] and (3) a comprehensive case management system.[16]

Issues Related to Nutrition Services in Maternal and Child Health

1. Not all health care programs have developed guidelines to define what nutrition services are to be included or how they are to be provided to individual clients.
2. Nutrition surveillance programs are limited because not all states participate, data are not collected from all individuals at risk within a state, and items in the data base are not comprehensive.
3. A large number of health care programs provide only partial nutrition services, frequently limited to screening, and particularly lacking in nutrition counseling by qualified personnel. Examples are:
    - Some health programs consider referral to the WIC program fulfillment of nutrition services. The WIC program is not designed to include in-depth assessment or individual nutrition counseling. Additionally, only those individuals who meet WIC eligibility requirements receive services beyond screening;
    - Availability of nutrition education and counseling is especially limited in the private practice setting; and
    - Nutrition education and counseling directed to the special needs of teenagers and of clients who have language barriers and low educational levels are frequently unavailable.
4. Funding for nutrition services is inadequate.
5. Nutrition counseling is often available only through referral to a provider in a setting separate from that of other members of the health care team. There is difficulty with integration of nutrition services into total health care.
6. Documentation of nutrition services in health records is not adequate for quality improvement.
7. Evaluation of nutrition education and counseling is inadequate.

Recommendations for Nutrition Services in Maternal and Child Health

1. Guidelines which define all of the components of nutrition services, how they are to be provided to individual clients, and qualifications of providers of those services should be established in all health care programs.
2. Nutrition surveillance programs should be expanded to include all individuals at risk.
3. Improvement should be made in the quality and comprehensiveness of items in the data bases for nutrition surveillance.
4. Additional personnel qualified to provide nutrition services should be included in both public agency and private practice health care settings.
5. Payment for nutrition services should be expanded through allocation of funds from the MCH block grant and third-party payments.

6. Nutrition services should be included in the setting for total health care services. There should be close intercommunication between all members of the health care team regarding an individual client's care.
7. Improvement should be made in systems for documenting nutrition services in order to allow monitoring of clients' health care, communicating of clients' health care needs to the health care team, and assessing quality of care.
8. Additional tools for evaluation of nutrition education and counseling should be developed.
9. Emphasis on the development of evaluation skills should be included in educational programs for dietitians and nutritionists.
10. The Year 2000 National Health Objectives for nutrition should be addressed in nutrition education programs.

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Quality Assurance

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Quality assurance is defined as "a problem-solving approach to measure and monitor health care to assure that it is effective and efficient."[1] Quality assurance programs offer a rational systematic approach to the reconciliation of the frequently conflicting values, interests, and needs of the constituents of a health care system, namely, consumers, regulatory agencies, and health care practitioners. In order to be effective, a quality assurance program must be organized and administered by health care practitioners working in concert with health care consumers. Assessment of the quality of health care, feedback of results to the health care practitioners involved, and implementation of corrective actions when needed are three essential components of a quality assurance program.[1]

Quality assurance programs have been evolving since the early 1900s when the major thrust for ensuring quality care came from health professionals in the private nongovernment sector of the health care system. Controlling costs became the major impetus for quality assurance beginning in the 1950s. Increased government involvement and financing in the health care system began with the Social Security Act Amendments in 1965, enacting Medicare and Medicaid, which funded medical care for the aged and persons of low income. As a result, governmental regulatory agencies became involved in the process of assessing care.[2]

During the 1970s, quality assurance programs experienced rapid growth, fueled by several factors including legislation, a greater interest in professional accountability, consumer demands, rising health care costs, and health care reimbursement. In 1981, the Joint Commission on Accreditation of Hospitals (JCAH) implemented new standards requiring that quality assurance activities be implemented on a hospital-wide basis. The Social Security Amendments of 1983 established a mandatory prospective payment system based on Diagnosis Related Groups (DRGs) for Medicare and Medicaid patients. Under this system, quality assurance is needed to establish standards that promote cost-effectiveness without compromising quality of care.[2]

In 1986, JCAH introduced its Agenda for Change, which shifts the agency's focus from determining a health care organization's capability of delivering quality care to determining whether quality health care is provided.[3] The thrust of this major project is twofold: (1) careful attention to the process and outcome of care, and (2) continuous improvement in patient care services. As part of the Agenda for Change, JCAH published the *1990 Ambulatory Health Care Standards Manual*.[4] Thus, the continuing evolution of quality assurance programs in hospitals and ambulatory care centers responds to new technology and the increasing complexity of health care delivery.

Improved consumer health outcome is the primary goal of a quality assurance program, although consumer input has traditionally been overlooked in health care planning and evaluation. Today, health care consumers want to know that they are receiving safe, high-quality, and efficient care. More consumers demand accurate and complete information regarding their health care and health status. They want to be actively involved in decision making regarding their care and that of their family members. More and more, informed consumers are motivated to make life-style changes, including changes in eating patterns. A quality assurance program can help health care planners and administrators identify consumer needs, identify problems and gaps in the health care system, and make appropriate health care changes, which in turn boosts consumer confidence in the system.[1]

Government and regulatory agencies exert pressure on the health care system through requirements and regulations in the areas of quality control, cost containment, utilization of services, and resource planning. Often these requirements and regulations result when health care providers seem unable to monitor themselves or to solve problems such as ineffective care delivery, duplication of services, misutilization of resources, and the escalating cost of high-technology medical care. Quality assurance programs can help to meet the requirements and regulations of governmental agencies, provide supportive data, and in some instances preclude the need for further regulation.[1]

Besides bringing their expertise and experience to the health care system, health care practitioners also bring their expectations of the system, including job satisfaction, professional growth, career development, competitive salaries, job security, and opportunities for continuing education. A safe work environment and adequate administrative support are necessary. A quality assurance program can identify gaps in the system as they relate to meeting the needs of health care practitioners, including those necessary to perform their jobs, and corrective actions can be implemented.[1]

Quality assurance is an ongoing process, helping practitioners continually move toward state-of-the-art practice, because decisions are based on the best available scientific knowledge and practice. Another benefit of quality assurance is that it can be used to test whether a health claim or a particular intervention is valid. Other benefits of quality assurance programs include satisfied health care consumers, more effective clinical care systems, increased revenue, increased employee productivity and morale, and reduced costs. Because of the dynamic nature of the process, there are always new issues/problems that need to be addressed.

Terminology

Before discussing quality assurance in ambulatory nutrition care, it is important to understand the terminology which is frequently used in discussions of quality assurance. The term *criteria*, which is defined as predetermined key elements of health care services used for quality assurance, has traditionally been used in ambulatory care settings. Criteria are professionally developed statements of desirable health care processes or desired outcomes.[1] The term *indicator* has traditionally been used in reference to acute care procedures.[2]

As part of the Agenda for Change, JCAH has begun development of *clinical indicators*, which are defined, measurable variables "related to the structure, process, or outcome of an important aspect of care for which data are collected in the monitoring and evaluation process."[4] An indicator is not a direct measure of quality, but rather a flag that identifies specific performance issues that need further review within a health care organization. "An indicator expresses information as an event or a ratio of events within a defined universe."[5] As data are collected, numerical values (norms) will be developed for each indicator and will be used to monitor deviations.[5] Under the Agenda for Change, quality assurance systems will be data-driven. Full implementation for the Agenda for Change is targeted for the early 1990s and will begin in hospitals.[3]

Most of the models reviewed in this chapter are for use in ambulatory care settings which traditionally have used the term *criteria*. For this reason, the term *criteria* will be used throughout the remainder of this chapter. Figure 11.1 defines additional terms commonly used in quality assurance programs, and figure 11.2 defines additional terms used in conjunction with quality improvement programs of the JCAH's Agenda for Change.

Quality Assurance in Ambulatory Nutrition Care

Ambulatory health care settings present unique problems when they are compared to acute care settings. Health care providers who practice in an ambulatory care setting have much less control over patient care than do those who practice in an acute care setting. Much of the responsibility for health care, such as keeping appointments and following through with treatment plans, must be accepted by the client and the client's family. Often the medical records and data systems in ambulatory care settings are not as sophisticated and detailed as those in acute care settings. Since documentation is a critical component of medical care, improvement of the record system may be a necessary step in the implementation of a quality assurance program.

An effective nutrition quality assurance program in an ambulatory care setting requires the following:[1]

1. Establishment of criteria based on best current scientific knowledge and proven practice;
2. Incorporation of key nutrition care criteria into ambulatory health care programs;
3. Specification of acceptable performance levels to determine program effectiveness;
4. Recognition of accomplishment by those health care providers achieving recommended levels of performance;
5. Identification of unacceptable performance and the need for improvement;
6. Correction of problems associated with inadequate and/or unacceptable performance;
7. Establishment of an ongoing monitoring system.

Quality Assurance in Nutrition Program Planning and Evaluation

Figure 11.3 depicts a circular model, modified from Suchman's work, which shows that quality assurance plays a role in each of the major components of program planning and evaluation.[1] In addition, Kaufman[1] describes eight elements of quality assurance which should be integrated into a comprehensive nutrition program. A discussion of the elements encompassed by these two models follows.

Value formation

Values of consumers, institutions, and health care professionals determine the objectives of health care programs. Realizing and appreciating societal values helps health and nutrition professionals set priorities for their programs. Ultimately, the priorities in nutrition care should be based upon current findings in nutrition research. Cultural aspects of food and diet, however, must be taken into consideration. Meshing the needs and values of consumers with the knowledge and expertise of nutrition practitioners is essential to achieving the greatest acceptance of the nutrition program. These values change with the advent of new scientific informa-

Figure 11.1: Quality assurance terminology

Criteria	Predetermined key elements of health care services used for quality assurance; professionally developed statements of desirable health care processes or desired outcomes. This term is used more commonly in ambulatory care settings than in acute care settings.
Indicator	This term is often used synonymously with *criteria*, but it is used more commonly in acute care settings.
Process criteria	Predetermined elements of health care which identify key activities or procedures used by health care providers in managing a defined health condition in the delivery of patient care. Examples of process criteria in nutrition care include assessment, development of a care plan, counseling, referrals, and follow-up.
Outcome criteria	Predetermined elements of health care which identify measurable and observable end results of change in the health status of the patient. Outcome criteria are the ultimate indicators of quality of patient care. Examples of outcome criteria in nutrition care include attaining and maintaining an appropriate growth curve for pediatric patients, normal lab values, and the delivery of a full-term, appropriate-for-gestational-age infant.
Structure criteria	Organizational elements such as staff qualifications, staff-to-patient ratios, physical facilities and equipment, fiscal resources and their management, which contribute to the quality and quantity of health care.
RUMBA characteristics	An acronym which defines the desirable characteristics of a quality assurance criteria, namely, that it be: Relevant, Understandable, Measurable, Behavioral, and Achievable.
Protocol	An essential component of a quality assurance program which describes the systematic series of processes or procedures specifying an agency's plan for health care for a specific target population or health condition.
Audit	A formal examination of documentation of outcomes or processes of health care to determine if criteria are being met.
Standard	Professionally developed statements indicating the acceptable level of performance for health care delivery.

Sources: Kaufman, M., Vermeersch, J., Bogle, M., Caldwell, M., Joyner, G., Kerwin, D., Lee, S., Mullis, R., Owen, A. Y., and Wong, F. (Eds.). (1983). *Guide to quality assurance in ambulatory nutrition care.* Chicago: American Dietetic Association.

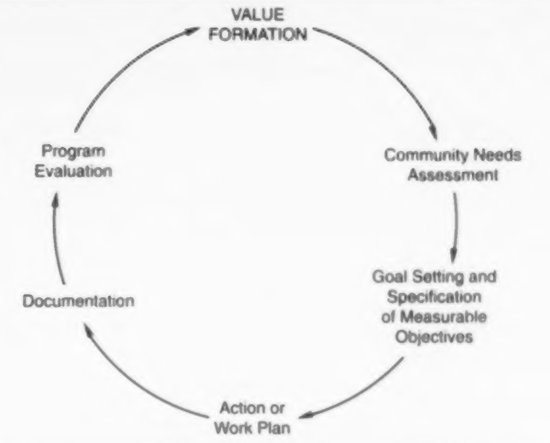
Mullis, R., and Priday, D. (1989). *Quality assurance in nutrition care.* Minneapolis: University of Minnesota, ISP in Nutrition Administration.

Figure 11.2: Quality improvement terminology (JCAH Agenda for Change)

Sentinel event indicator	A general type of indicator which measures a serious, undesirable, and often avoidable process or outcome.
Rate-based indicator	A general type of indicator, which measures a patient care event that requires further assessment only if the rate of events shows a significant trend within an institution over time, exceeds predetermined thresholds, or evidences significant differences when compared to that of peer institutions; it usually measures a patient care event for which a certain rate of occurrence is acceptable.
Outcome indicator	An indicator which measures what happens to the patient after something is done to the patient.
Process indicator	An indicator which measures a care activity done for a patient; it generally measures discrete important steps in the patient care process.
Validity	The degree to which the indicator accomplishes its purpose, such as the identification of situations in which the quality of care and service should be improved.
Sensitivity	How well an indicator can detect all cases in which actual quality of care problems exist ("true-positive" cases).
Specificity	How well an indicator can detect only those cases in which actual quality of care problems exist.
Continuing education	Education beyond initial professional preparation that is relevant to the type of patient care delivered in the organization, provides current knowledge relevant to the individual's field of practice, and is related to findings from quality assurance activities.
Evaluation	The review and assessment of the quality and appropriateness of an important aspect of care. The review and assessment is designed to identify opportunities to improve and/or problems in care and, when they are identified, to develop plans to take the opportunities to improve or solve the problems in care.
Indicator	A defined, measurable variable relating to the structure, process, or outcome of an important aspect of care for which data are collected in the monitoring and evaluation process.
Monitoring	The systematic and ongoing collection and organization of data related to the indicators of the quality and appropriateness of important aspects of care and the comparison of cumulative data with thresholds for evaluation related to each indicator.
Patient care quality	The degree to which patient care services increase the probability of desired patient outcomes and reduce the probability of undesired outcomes, given the current state of knowledge.

Source: Joint Commission on Accreditation of Healthcare Organizations. (1989). *The Joint Commission 1990 ambulatory health care standards manual*. Chicago: Author.

Figure 11.3: Circular model for planning and evaluation


VALUE FORMATION
Community Needs Assessment
Goal Setting and Specification of Measurable Objectives
Action or Work Plan
Documentation
Program Evaluation

Source: M. Kaufman et al. (Eds.). (1983). *Guide to quality assurance in ambulatory nutrition care.* Chicago, IL: American Dietetic Association. (As modified from E. A. Suchman, 1967, *Evaluative Research,* Russell Sage Foundation, New York.)

tion and with societal change. This emphasizes once again the dynamic nature of the quality assurance process. An example of conflicting values is for a WIC program to promote breastfeeding while implementing an infant formula rebate system.

Needs assessment

A needs assessment is vital to the identification of health and nutrition problems, risk factors, and concerns among a targeted group or groups. Based on a variety of health and demographic data surveys, and based on other studies, a needs assessment is essential to the planning of appropriate health and nutrition care for program clientele.

Goal setting and specification of objectives

Goals and objectives for nutrition services are based on the needs assessment. The broad, long-range mission of the program is stated in the goal. Objectives are predetermined elements of care which address identified problems and lead to change in the expected results of nutrition program activities within a specified time frame. Setting goals and writing objectives takes time, planning, and follow-through. Objectives must be measurable and must be updated as new scientific knowledge becomes available.

Action or work plan

The plan provides the framework for nutrition services. It specifies the structural criteria, including time line, budget, and staff requirements, that need to be considered in the quality assurance process.

The work plan specifies services which should be made available to every client, such as:[6]

- Nutrition screening and assessment, including anthropometric, biochemical, clinical, and dietary measures, and socioeconomic history;
- Nutrition intervention including nutrition counseling and education based upon a written care plan;
- Referral as needed to providers of food assistance, health services, educational assistance, and social services;
- Follow-up and evaluation to determine the results of services provided.

Adequate budget and staff are necessary for the provision of these services.[1]

Professional standards of practice

Professional standards of practice, like other components of quality assurance, are based upon current research and practice, and require continual updating. In October 1984, the House of Delegates, American Dietetic Association, approved the Standards of Practice for the Profession of Dietetics. The 1986 publication *Standards of Practice: A Practitioner's Guide to Implementation* includes six standards for use by the individual practitioner in all areas of dietetic practice.[7]

Policies and procedures

Policies and procedures define the specific nutrition services to be provided to a defined patient population. Protocols, which systematically list the processes of the agency's plan for nutrition care, are components of a health care agency's policies and procedures.

Process and outcome criteria

Process and outcome criteria are the predetermined key minimal elements of care to be provided to a specific target population. When quality assurance criteria include the desirable characteristics of RUMBA (Relevant, Understandable, Measurable, Behavioral, and Achievable) they can provide the standards by which nutrition practice is audited and the basis for the program plan objectives.

Process and outcome criteria should be ratified by all health care providers who will be affected by the quality assessment. Each practitioner involved should have the opportunity to accept or reject a criterion by which the practitioner's work will be assessed. The ratification process is described in detail in the 1978 publication by the American Dietetic Association, entitled *Patient Care Audit: A Quality Assurance Procedure Manual for Dietitians.*[8]

Before implementation, process and outcome criteria should be field-tested to identify any potential problems with the criteria. For example, in *Quality Assurance Criteria for Pediatric Nutrition Conditions: A Model,*[9] results of field-testing each criterion are reported. In the criteria set for normal, healthy, premature infants, the criterion regarding adequate hematocrit levels was changed as a result of field-testing to adequate hematocrit or hemoglobin levels.[9]

Several nutrition criteria sets for specified target populations have been published by different groups of nutrition professionals. While such criteria can serve as examples, health care practitioners and administrators must be aware that a "cookbook" approach to quality assurance does not exist. The published criteria sets must be adapted and modified to fit the individual needs of a health care agency. To help with this process, definitions of terms used in criteria sets are listed in figure 11.4.

For in-depth studies of nutrition care, a criteria set, individualized according to the needs of the agency, could be used in its entirety. In some situations, an institution

Figure 11.4: Criteria set terminology

Critical time	A specified period of time within which a criterion will be met.
Accepted level of performance	A level of performance, written as a percentage, in the cumulative data that specifies that the criterion has been met.
Exceptions	Predetermined situations or circumstances which would prevent the achievement of a criterion because of conditions beyond the control of the health care practitioner or the patient.
References	The most current scientific literature upon which a criterion is based.
Audit data source	The place where the necessary data is located, usually the patient's medical record.

Source: Kaufman, M., Vermeersch, J., Bogle, M., Caldwell, M., Joyner, G., Kerwin, D., Lee, S., Mullis, R., Owen, A. Y., and Wong, F. (Eds.). (1983). *Guide to quality assurance in ambulatory nutrition care.* Chicago: American Dietetic Association.

may want to look at total patient care instead of just nutrition care. These criteria sets would then be developed by a multidisciplinary team, with the nutrition professional choosing only the two or three criteria deemed to be most important. The published criteria sets need to be not only adapted to the individual health care setting, but also updated as new research and practice redefines optimal patient care.

Care must be taken in writing criteria sets and/or adapting published criteria sets to make sure that they are reasonable objectives for the individual institution. In legal matters, such documents could be considered usual and standard practice. This again points to the fact that quality assurance programs need to be designed carefully and continually updated.

Documentation

Documentation is an essential component of quality assurance. It is imperative that a written record of the procedures or protocols which have been completed be maintained. If it is not documented, an evaluator or auditor has no way of knowing whether the procedure or protocol was carried out, and the assumption is made that it was not done.[10]

Documentation is usually made in the medical record, where it is available to all health care providers and for audit purposes. The Problem-Oriented Medical Record (POMR) and the SOAP (subjective, objective, assessment, and plan) format of recording notes are useful in quality assurance programs because they organize the sequence of care provided.

Health care providers must be familiar with the agency's goals, objectives, policies, procedures, and protocols. As previously stated, the providers of the care should be involved in the development of the process and outcome criteria upon which their work will be evaluated. Through involvement in the identification of key factors in the delivery of health care to a specified target population, the health care practitioner knows what to focus on during the time spent with the client. This focus is then reflected in the documentation.

One problem experienced by some nutrition professionals in an ambulatory care setting is that often other professionals, such as nurses, aides, and health educators, are responsible for providing and subsequently documenting some aspects of the patient's nutrition care. Yet, the nutrition professionals do not have administrative authority for supervising these other health care professionals.[10] If proper documentation is not completed, this can be a negative reflection on the delivery of nutrition care. An example of this situation is given in *Quality Assurance Criteria for Pediatric Nutrition Conditions: A Model.*[9] In field-testing a criterion regarding Vitamin D supplementation in breastfed infants from birth to six months of age, the criterion was met from 0–87 percent of the time. While supplementation was routine in all audited sites, the lack of documentation resulted in low field-test findings. Among the cases in which supplementation was documented the criterion was met 74–78 percent of the time.[9] This example demonstrates the type of information that can be obtained through an audit, prompting reevaluation of the procedure and appropriate changes.

Written audit system

The word *audit* often elicits defensiveness among health care providers, yet a written audit can contribute to improvement of services and job satisfaction. A quality assurance system should not be punitive or threatening. In addition to identifying areas needing improvement or gaps in the system, an audit as part of an agency-wide quality assurance program can have very positive effects, including a sense of pride in a job well done, increased motivation, a feeling of success, and a measurement of accomplishment.[11] For a successful audit, the information in the medical record and/or family folder must be accessible to the evaluator and documented in an organized fashion.

Statistical reporting system

A statistical reporting system reports data on services rendered and includes client status and outcomes. In a quality assurance program, access to baseline data is important. Lack of a sophisticated computerized system should not be a deterrent to the establishment of a reporting system. Tallies done by hand also suffice.

Educational plan

Based on quality assurance activities, the educational plan includes provisions for continuing education activities that are relevant to the type of patient care delivered in the organization and that are applicable to the individual health care provider's field of practice. The ultimate outcome of the educational plan is to improve patient care by addressing problems identified in the quality assurance process.

Program evaluation

Program evaluation is the part of quality assurance which measures the results of health care against the predetermined objectives and criteria. When quality assurance criteria are based on current scientific research and practice, they should be able to predict that a specified series of interventions will bring about certain expected results for target populations. Program evaluation indicates how effective the planned health care is in achieving the agency's objectives.

Program evaluation is an essential component of the quality assurance process and must be included in the overall program from the very beginning. The results of the evaluation should directly feed into the next planning cycle of a program.

The dynamic nature of the quality assurance process is paramount. The work is ongoing as health care providers continually strive toward greater improvements in patient care and health care outcomes.

Selected Quality Assurance References

Quality Assurance Criteria for Pediatric Nutrition Conditions: A Model[9]

The development of the 13 criteria sets published in this manual was an eight-year process undertaken by the Pediatric Nutrition Practice Group (formerly Dietitians in Pediatric Practice) of the American Dietetic Association. Key minimal elements of care were identified for specific target populations, ratified, and field-tested by a cross-section of pediatric nutrition specialists. In addition to the criteria sets, the manual contains a synopsis of field-testing results and examples of protocol items. Additional criteria sets are in various stages of development and will be published as supplements to the original publication.

Perinatal Nutrition: Criteria for Quality Assurance[12]

This manual, published by the Wisconsin Association for Perinatal Care, contains field-tested criteria sets for the following target populations: pregnant woman, breastfeeding woman, normal infant, and a preconception nutrition criteria set for a woman of childbearing age 15–44 years. Also included is a section on the application of the criteria sets in practice, a section on the steps involved in an audit, a glossary of terms, and a section on procedures for conducting a field test.

Guidelines for the Care of Children with Chronic Lung Disease[13]

These guidelines address the long-term community-based management of three diseases: bronchopulmonary dysplasia, asthma, and cystic fibrosis. They represent a consensus of the current clinical practices of eight pediatric pulmonary centers which are training centers. Since these centers utilize an interdisciplinary approach, input was obtained from the following disciplines: medicine, nursing, nutrition, physical therapy, respiratory therapy, and social services.

For each disease, broad goals and objectives are listed, followed by care procedures and tasks to be performed by health care providers from each of the disciplines. These guidelines are protocol items and are described in the introduction as "an initial attempt to delineate ideal care currently practiced in the community setting."[13]

Nutrition Care Guidelines[14]

Written by pediatric dietitians in the greater New York area hospitals, this publication contains ambulatory nutrition care protocols for pediatric patients with cystic fibrosis, renal disease, diabetes mellitus, and cancer, which are among the conditions served by the New York State Crippled Children's Program. The protocols were field-tested in two to three ambulatory care settings and revised based on the field-test results.

These protocols include the following components: (1) identification of the target population, (2) brief background information and implications for nutrition care, (3) brief bibliography, and (4) the protocol itself. The protocol includes screening, assessment, analysis and interpretation of findings, intervention, and monitoring.

Enhancing Quality: Standards and Indicators of Quality Care for Children with Special Health Care Needs[15]

This publication was developed by New England SERVE, and identifies "key elements contributing to quality health care for children with chronic illness or disability and their families."[15] The "standards or indicators" are written generically rather than addressed to a specific target population or discipline.

Written by parents, health care providers, and policymakers, the standards cover the following five areas: (1) individualized services, (2) health care professional and team characteristics, (3) health care agency or facility responsibilities, (4) state health department responsibilities, and (5) guidelines for community and societal supports. The manual was designed for a wide range of users and can be used for education and training, program assessment, and advocacy efforts.

Other References

Various organizations and associations have attempted to turn broad and widely accepted nutrition priorities into quantified goals and objectives. There is a common thread throughout these documents—they are directed at healthy outcomes, whether for the general population or a target group. As stated earlier, the primary goal of a quality assurance program is to improve consumer health outcome. These documents address this component of quality assurance and provide a framework for the development of local or targeted goals and objectives.

Most of the documents have gone through review during developmental stages, including field-testing and public hearings. Some of these documents have been revised two or three times, demonstrating that the development of goals and objectives is an ongoing process. One can learn from such efforts by reviewing past editions or by reading prefaces that discuss the reasons the documents were changed. When Miller and Stephenson summarized problems associated with the 1990 Health Objectives for the Nation, they found that lack of data is a major deterrent in quantifying and measuring specific objectives.[16] Interpretation and feasibility were questioned when overly broad or general objectives were used. Another problem identified was that some objectives were not based on substantiated data.

The document *Healthy People 2000: National Health Promotion and Disease Prevention Objectives* has recently been published.[17] The objectives are organized into four major sections: Health Promotion, Health Protection, Clinical Preventive Services, and System Improvement Priorities. There are a total of 21 priority areas under these categories. In most priorities, objectives are organized into five types, health status, risk reduction, public awareness, professional education and awareness, and services and protection. This document includes baseline data, tables for special population targets and type-specific targets, graphs depicting trends and projections, and commentary describing the importance of the objective and sources of baseline and future data to track the objective. This is valuable resource material for the individual who is developing a quality assurance program.

Collaborative efforts by the American Public Health Association, the Centers for Disease Control, and other organizations were initiated in 1985 to promote the adoption and implementation of model standards throughout the nation. The second edition is currently being revised and expanded to include the Year 2000 Objectives for the Nation and will be entitled *Healthy Communities 2000: Model Standards Guidelines for the Year 2000 National Health Objectives*.[18] This document will complement the Year 2000 National Health Objectives and provide additional suggestions for implementation.

Another set of reference objectives is the *Model State Nutrition Objectives*[19] developed by the Association of State and Territorial Public Health Nutrition Directors (ASTPHND). This document includes 19 objectives in six categories. ASTPHND recommends that these objectives be used as a planning document to set priorities, direct resources, standardize methods, stimulate planning, and encourage support for nutrition activities—all components of quality assurance.

Nutrition Service Standards[20] and its companion document, *Ensuring the Quality of Nutrition Services in the WIC Program*,[21] were developed by the WIC Nutrition Services Committee, National Association of WIC Directors. The 12 standards apply to the following nutrition services components: nutrition/health assessment, nutrition services plan, nutrition education, qualifications and roles of nutritionists, nutrition staff training, and food packages. The companion document describes nutrition services and includes specific goals and recommendations for providing quality nutrition services in WIC.

Several state public health agencies have developed quality assurance materials with titles ranging from criteria sets to standards. Each of these can serve as a reference for developing a quality assurance program. Some states have data available through their nutrition monitoring systems which may be helpful in planning programs. Examples are the Pediatric Nutrition Surveillance System and the Pregnancy Nutrition Surveillance System.

In the fall of 1990, the American Academy of Pediatrics and the American Public Health Association will publish standards for the provision of quality child care in out-of-home settings. These recommendations will range from basic guidelines for the physical conditions of child care facilities to improvements in the areas of hygiene, nutrition, food service, and staff training. This document can serve as a reference for the development of a quality assurance program for this target group.

Other excellent references for quality assurance activities are reports such as *The Surgeon General's Report on Nutrition and Health*[22] and *Diet and Health Implications for Reducing Chronic Disease Risk*.[23] Reports such as these lend credence to the emphasis on the role of nutrition and diet in health promotion and disease prevention.

Problems and Gaps in Quality Assurance

Including quality assurance as a major component of program management requires significant changes in attitude, training efforts, skill levels, and time allocation of top management. In addition, several problems and gaps in the overall quality assurance field exist that may serve as barriers to implementation. A discussion of some of these problems follows.

Lack of standardized terminology

Quality assurance terminology has not only changed over the years, but continues to be confusing. Terms such as *criteria* and *indicators* may seem similar at first glance, but there are distinct differences with respect to implementation. Some terms are used interchangeably and may or may not have the same meaning. Standardization of the terminology of quality assurance is needed.

Lack of administration/staff understanding and acceptance

Health care providers and administrators may initially be overwhelmed by the process of quality assurance. Often times, many quality assurance elements are already in place and can be capitalized on to develop a quality assurance program. For example, health care providers may follow certain procedures, which may or may not be documented, in caring for a specific target population. An agency protocol for use in quality assurance can be based upon these procedures. Likewise, other segments of quality assurance may already be partially implemented, so the process may not be as cumbersome as first perceived. An understanding and acceptance of quality assurance as an integral component of health care delivery is critical.

Lack of practical guide for implementation

As shown in this chapter, many of the quality assurance models which have been published approach the quality assurance process differently. All of these can serve as resources but must be adapted to each individual setting. It would be helpful to have a generic practical guide to the process that can be used by agencies.

Lack of examples of criteria for specific target groups and conditions

A lack of examples of criteria sets exists for some high-risk target populations. High priority should be given to the following conditions: pregnancy complicated by medical problems such as diabetes mellitus; maternal and pediatric AIDS; and drug abuse in pregnancy, adolescence, and childhood.

Need for more expertise in evaluation design

The evaluation component must be carefully planned and developed from the beginning of the quality assurance program. In some instances, additional training or hiring of a consultant is necessary in order to design an effective evaluation program. The fact that evaluation takes time must also be considered.

Lack of data or access to data

There are existing data systems available for use in establishing baseline information and tracking progress. Examples include national survey data, census data, birth and death statistics, nutrition monitoring and surveillance systems, and specific national, state, and local organizations' and agencies' data collection systems. A priority within each organization should be to consider, in the design phase, ways to easily retrieve pertinent data for use in tracking progress towards specific objectives. Units of measurement for data need to be standardized so that comparison of evaluation studies will be reliable.

Summary

Quality assurance, with all of its components, is a challenge in today's health care setting. The needs and values of health care consumers must be meshed with the knowledge and expertise of health care providers to provide quality health care while satisfying the requirements of regulatory agencies. Improved consumer satisfaction and improved job satisfaction on the part of the provider are additional benefits. Careful documentation and administrative support are essential to the implementation of a strong and productive quality assurance program. The ultimate goal of quality assurance is always optimal patient care.

Quality assurance must be built into all new developing programs and fit into existing programs. Organizations with similar interests need to collaborate on formulating standardized measurements. Dissemination of results of quality assurance programs should be encouraged in order to assist in the formulation of standardized activities, measurements, and terminology.

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Personnel for Delivery of Nutrition Services

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The previous chapters discuss the nutrition needs of the various maternal and child populations, and define the nutrition services needed by women during their childbearing years, infants, children, adolescents, and children with special health care needs. The benefits of a family-centered, community-based approach to health and nutrition services are stressed. While people of all ages require a nutritionally adequate, safe food supply, childbearing women, infants, and children have increased nutrient needs for growth and development. These populations in particular require nutrition care which considers their unique needs and includes nutrition screening and assessment, nutrition education, and counseling. In addition to health and nutrition care, some need referrals for food assistance, income maintenance, and other support services to facilitate their use of nutrition services.

This chapter discusses the various health personnel who arrange or provide nutrition care for mothers and children in the community. It attempts to differentiate their roles, responsibilities, and training. It also summarizes the limited data available on numbers of personnel in relation to population needs.

There is a complex array of community, home care, day care, educational, residential, and health care agencies and institutions in which women and children receive some or all of the components of their nutrition care. These food and nutrition services are delivered by a variety of professionals and paraprofessionals with different levels of nutrition knowledge. Identifying and describing all of the personnel who are employed in the agencies and facilities providing nutrition care and food services is a very complicated task, as is the assessment of the competencies of those who provide nutrition care in relation to the specific needs of the clients they serve. Assessing the competencies and numbers of personnel providing nutrition services to mothers and children is constrained by the fact that:

1. The delivery of nutrition services is fragmented throughout diverse systems whose primary missions range from health care to social services and education;
2. Professional, paraprofessional, and auxiliary personnel involved in various aspects of food and nutrition services for mothers and children have widely divergent roles, responsibilities, and qualifications;
3. No systematic data sources provide information on location, types, numbers or credentials of nutrition or nutrition-related personnel in the many service delivery setings; and
4. Many states do not have official city and/or county health agencies to deliver maternal and child health services at the grassroots level. In these states it is difficult even to obtain accurate data on the numbers, types, and qualifications of personnel who provide nutrition care to mothers and children in health care settings.

While some state, city, or county agency personnel systems have established standards to define education and experience qualifications for nutritionist positions, there are none that are used uniformly across the country in all of the various service settings. Some settings, in fact, have no personnel standards for nutrition personnel.

Nutrition Personnel

Figure 12.1 lists the nutrition personnel and other health professional and paraprofessional personnel who deliver nutrition care to women and/or children in health care settings; figure 12.2 lists personnel who direct food services or provide nutrition education to women and children in educational institutions and human service agencies. This paper focuses on those nutrition personnel who are qualified to provide nutrition care in health care agencies.

With the current emphasis on community-based, family-centered services, leadership responsibilities in nutrition care should be assumed by public health nutritionists employed in state and local official health agencies whose mission has been defined to assess community need, develop policy, assure that essential services are delivered, and maintain ongoing evaluation.[1] Public health agencies cite health promotion or primary prevention as their primary mission. Personnel in public health agencies may also coordinate, arrange, and/or provide the secondary and tertiary prevention services which include screening, diagnosis, treatment, and rehabilitation. Public health nutritionists contribute to the health of mothers and children by working to identify/assess nutrition needs and problems; establish nutrition policies and standards; improve their access to a safe, adequate, nutritious food supply; promote consistent nutrition education messages throughout the community and strive to develop and coordinate nutrition services throughout the health, human service, and education systems.

In health care facilities such as hospitals and long-term care facilities, registered dietitians provide nutrition care, including screening, diagnosis, treatment, and rehabilitation services for both inpatients and outpatients. They may refer patients to community agencies for continuing nutrition care, food or financial assistance, or other human services that will facilitate their nutrition care.

Public Health Nutritionists

Roles and responsibilities

The public health nutritionist is defined as the member of the public health agency staff who is responsible for assessing community nutrition needs and planning, arranging, managing, directing, coordinating, and evaluating the nutrition component of the health agency's services. The public health nutritionist establishes linkages with related community nutrition programs, nutrition education, food assistance, social or human services, child care, and community-based research.[2] The major roles of the public health nutritionist are assessing the community and its population; policymaking; planning and evaluating; and coordinating, consulting, educating, and managing, as distinguished from providing one-on-one nutrition counseling. Public health nutritionists are primarily employed in federal, state, and local public health departments; neighborhood or comprehensive health centers; health maintenance organizations; home health agencies; developmental evaluation centers; and special community health projects. Public health nutritionists usually function as part of an interdisciplinary team that includes physicians, dentists, nurses, health educators, social workers, and environmental health specialists.[2]

On the staff of the federal, state, and larger city and/or county health agencies, nutritionists work closely with the Maternal and Child Health Program Director and

Figure 12.1: Personnel in health care settings providing nutrition services as part of health care to women and children

	Public Health Agencies	Community Health Centers, HMOs, Developmental Evaluation Centers	Private Practice/ Group Practice	Voluntary Health Agencies, Home Health Agencies	Hospitals, Rehabilitation Facilities, Mental Health/ Retardation Facilities
NUTRITION PERSONNEL					
Public Health Nutritionists	● and	● or	■	● or	—
Nutritionists/Dietitians	●	●	●	●	●
Nutrition/Dietetic Technicians	■	■	—	—	●
Nutrition Aides	■	■	—	—	—
Dietetic Assistants	—	—	—	—	●
HEALTH PERSONNEL					
Physicians	●	●	●	●	●
Dentists	■	●	●	■	—
Nurses	●	●	●	●	●

Code: Usual = ●; Optional = ■

Figure 12.2: Personnel in community settings providing food service and/or nutrition education to children

	Schools	Day Care, Head Start, Out-of-Home Care	Community (e.g., Cooperative Extension, Community Action, Social Service Agencies)	Residential Facilities	Shelters, Soup Kitchens
NUTRITION PERSONNEL					
Public Health Nutritionists	■	●	■	■	■
Nutritionists/Dietitians	●	■	●	■	■
Home Economists	●	■	●	—	■
Food Service Managers	●	●	—	●	●
EFNEP Aides	—	■	●	—	—
HEALTH PERSONNEL					
Teachers	●	●	—	—	—
Nurses	●	●	—	■	■

Code: Usual = ●; Optional = ■

his/her key staff consultants to develop policies, set standards and funding allocations, or negotiate contracts for programs in women's health, family planning, or preconceptional health care; prenatal care; breastfeeding promotion; infant care; preschool, school, and adolescent health care; and children's special health services.

Public health nutritionists in official agencies should also assure nutrition care and food service standards for out-of-home care or day care and residential care or group facilities serving women and children. As educators, public health nutritionists develop guidelines, manuals, and educational materials. They arrange or conduct training for professionals and paraprofessionals throughout their jurisdiction, particularly for staff of health and human service agencies and schools. Training may be conducted in collaboration with faculty in schools of public health, health science centers, colleges of human ecology, or other university nutrition departments. Public health nutritionists may be responsible for administering the actual delivery of services or may provide technical assistance for the nutrition care and education delivered by staff employed in a variety of local public and private institutions and agencies in their area. In approximately half of the state health agencies, public health nutritionists administer the Special Supplemental Food Program for Women, Infants, and Children (WIC).

Nutrition services are delivered by nutritionists employed at the grassroots level by city or county health departments, freestanding community health centers, health maintenance organizations, hospital-based ambulatory health care facilities, or in private practice. In many states there is a contractual arrangement between the state health agency and the local agencies or private practicioners that deliver the services. The contract may specify the type, quality, and quantity of services, and the credentials of the nutrition care providers. While public health nutritionists may provide some nutrition care, client care services are increasingly being provided by direct care nutritionists/registered dietitians or dietetic technicians trained in nutrition or dietetics but not necessarily in public health or community health.

Education and training

The master's level training recommended for public health nutritionists builds on the basic undergraduate preparation for the registered dietitian. *Strategies for Success: Curriculum Guide for Graduate Programs in Public Health Nutrition* was developed in 1989 by the Association of Faculties of Graduate Programs in Public Health Nutrition (AFGPPHN).[3] These updated guidelines are the basis for the curriculum and field training of the 20 participating graduate programs. Coursework includes advanced human nutrition throughout the life cycle in health and disease; public health subjects, including epidemiology, biostatistics, community assessment, program planning and evaluation, advocacy, leadership, and management; and social and behavioral sciences, public policy, and education. Supervised field experience is required both in health care facilities and public health agencies with well-established public health nutrition programs. AFGPPHN is exploring a process whereby graduate programs offering this curriculum may receive approval through an official educational credentialing body. These participating graduate programs together graduated approximately 140 students in 1990. The numbers of graduates has remained at about the same level since 1985.

Since maternal and child health is a traditional cornerstone of public health, students earning degrees in these graduate programs are usually well oriented to the health needs of mothers and children and the legislated programs which support nutrition services for this population. Such programs include Title V of the Social Security Act, which enables funding for the Maternal and Child Health Block Grant; Title XIX of the Social Security Act, which authorizes funding for Medicaid; and the Child Nutrition Act, which is the basis for the Special Supplemental Food Program for Women, Infants, and Children (WIC) as well as the other child feeding and nutrition education programs.

It was reported in 1989 that 14 state personnel systems require persons employed as public health nutritionists in official agencies to present a master's degree that includes public health coursework as well as advanced training in nutrition.[4] During the 1980s, there has been a trend noted for state personnel systems to downgrade educational qualifications for public health nutritionists in state and local agencies. Sixteen states accept a master's degree in nutrition or dietetics to be equivalent to the master's degree which includes public health coursework. Twenty-two states require only a bachelor's degree in community nutrition, nutrition, or dietetics for their public health nutritionist positions. Two states have no educational requirements. In 1989, an estimated 41 percent of public health nutritionists employed in state health agencies and 14 percent employed in city or county health agencies were reported to have public health training.[4]

Direct Care Nutritionists in Public Health Agencies

Roles and responsibilities

In the 1960s, with the initiation of Title V-funded projects which included maternity and infant care projects and health services projects for children and youth, public health agencies increased their primary care services and employed more direct care nutritionists to provide one-on-one counseling to clients in model prenatal clinics; infant, child and adolescent health programs; and programs for children with special health care needs. In 1972 the special projects grant fund was discontinued. State health agencies were encouraged to continue the projects using their maternal and child health formula grant, which in the 1980s became the Maternal and Child Health Block Grant.

In 1974 the WIC program was introduced. As agencies faced budget constraints, many public health and direct care nutritionist positions previously supported by Title V funds were transferred from the highly competitive and increasingly limited Title V funds to the expanding WIC program budgets. WIC funds could be used to employ nutritionists to provide the required nutrition education contacts delivered either one-on-one or in group classes. This new funding source has resulted in many new jobs for direct care nutritionists, but it has narrowed their function to a specific population of low-income pregnant or postpartum women, infants, and children who have a WIC-certifiable nutrition risk factor.

Education

It is generally recommended that those employed as direct care nutritionists be registered dietitians (RDs) or RD eligible, although not all state and local agencies require this credential. Many agencies employ persons with bachelor's degrees in home economics who have completed some basic courses in food and nutrition but who are not trained in clinical dietetics or nutrition care needed by high-risk mothers and children. The educational requirements for dietetic registration are discussed in more detail in the section of this chapter discussing registered dietitians in health care facilities.

Nutrition Paraprofessionals in Public Health Agencies

A small number of dietetic technicians (DTs) are employed in local public health agencies. They assist public health nutritionists and direct care nutritionists in routine nutrition screening and counsel low-risk clients. They may conduct group nutrition education classes and community outreach. Qualified dietetic technicians usually have completed one of the 37 American Dietetic Association-approved dietetic technician programs which offer a curriculum emphasis in nutrition care. This program, which leads to an associate degree, provides for the integration of didactic instruction with a minimum of 450 hours of supervised practice. Graduates of these approved programs can become registered dietetic technicians (RDT) by successfully writing a Dietetic Technician Registration Examination. Some graduates of baccalaureate programs who do not qualify to be registered dietitians are also employed as dietetic technicians.[5]

Some local health agencies also employ nutrition aides or community nutrition workers. These are usually persons from the indigenous community who are trained on the job to assist the nutritionists and conduct community outreach. Several state health agencies (e.g., Arizona and Florida) have developed curricula for on-the-job training for these paraprofessionals. Both dietetic technicians and community nutrition aides should be trained for their job responsibilities and closely supervised by a public health nutritionist or direct care nutritionist.

Public Health Nutrition Workforce

Figure 12.3 shows the numbers of public health nutritionists and direct care nutritionists in state and local official health agencies counted in the 1985, 1987, and 1989 Biennial Surveys of State and Local Public Health Nutrition Personnel conducted by the Association of State and Territorial Public Health Nutrition Directors (ASTPNHD).[4, 6, 7] In 1987 and 1989 direct care nutritionists were counted. These biennial surveys showed a marked decrease in the number of public health nutritionists from 1985 to 1987, with a very slight increase from 1987 to 1989.[4, 7] State and federal agencies that utilize nutritionists for policymaking, planning, and management responsibilities employ the larger proportion of public health nutritionists. City and county public health agencies employ about 2.5 times the total number of nutrition personnel, with the majority of local nutritionists being classified as direct care nutritionists. It is appropriate and cost-effective for local agencies to utilize a larger proportion of direct care nutritionists since they provide more primary care and home health care. Direct care nutritionists should work under the direction and supervision of a public health nutritionist.

Almost 50 percent of the positions for public health nutritionists in the state health agencies and 75 percent in the local health agencies are funded from the WIC program. Of the direct care nutritionists, 68 percent of the state positions and 90 percent of the city/county official agency positions are funded by WIC. The ASTPHND 1989 survey estimated approximately 2,700 state and local public health nutrition personnel positions funded by WIC.[4] The U.S. Department of Agriculture's FY 1988 WIC expenditure report showed 3,344 full-time equivalent (FTE) positions titled nutrition

Figure 12.3: Census of full-time equivalent positions (FTEs) for public health nutrition personnel in state and local *official* public health agencies, 1985, 1987, and 1989

	1985			1987			1989		
	SHAs*	LHAs+	Total	SHAs*	LHAs+	Total	SHAs*	LHAs+	Total
	N	N	N	N	N	N	N	N	N
P.H. Nutritionists (budgeted)	1,128	1,803	2,931	721	1,327	2,048	725	1,386	2,111
P.H. Nutritionists (contract)	Not determined			18	45	63	17	63	80
Direct Care Providers (budgeted)	Not determined			218	1,904	2,122	485	1,622	2,107
Direct Care Providers (contract)	Not determined			7	158	165	26	145	171
TOTAL				964	3,434	4,398	1,253	3,216	4,469

*State health agencies

+Local (city or county) health agencies

education personnel in state and local WIC programs.[8] The USDA's total is larger than the numbers counted in the ASTPHND survey because it includes some nutrition personnel in local WIC agencies that are not public health departments.

The vast majority of nutritionists now employed in the official state and local health agencies devote their efforts to WIC-eligible low-income pregnant, postpartum, and lactating women; infants; and children up to five years of age. Thus, a major issue for maternal and child health programs is the lack of availability of both public health nutritionists and direct care nutritionists to provide services for women's health or preconceptional health care, and for those pregnant, postpartum and lactating women, infants and children who are not eligible for WIC. Other important maternal and child health programs which need nutrition services, but for which limited nutrition personnel are available, are child day care, school health, adolescent health, and children with special health care needs programs.

There is no accurate way to estimate the number of public health nutritionists needed to adequately staff the nation's public health programs, including those serving the maternal and child health population. A general guideline used for public health nutritionists and several other public health disciplines is 1 public health nutritionist per 50,000 population served for the public health functions of assessment, policy development, planning, directing, and evaluating programs and services.[9] Applying this ratio to the 1990 U.S. population of almost 250,000,000 people suggests the need for about 5,000 public health nutritionists nationwide. Currently a total of 2,111 are employed in the official state and local public health agencies. These numbers suggest that the nation has less than half of the number of public health nutritionists that it needs. The numbers become even more distressing when the 1,438 positions funded by WIC are subtracted, leaving only 753 public health nutritionists to plan, direct, and evaluate generalized public health nutrition programs to serve the population as a whole, including women, infants, and children who are not eligible for WIC. This would suggest the need for approximately 4,250 more generalized public health nutritionists. The generalized public health nutritionists who are available tend to be concentrated in a few states that utilize some of their general revenue for public health nutrition services. Even for these states it is not known whether this so-called general revenue is actually the state match to the MCH Block Grant.

There is also a tremendous maldistribution of public health nutrition personnel across the United States. The largest concentration of public health nutrition personnel are employed in state and local official health agencies in the eight southeastern states included in U.S. Department of Health and Human Services Region IV (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carol-ina, and Tennessee). Particularly underserved are the states in the Northeast, the far Midwest, and the Northwest.

For direct care nutritionists, assisted by dietetic technicians who perform individual patient/client care, suggested staffing is based on the size and needs of the specific target client population, the average time allocated per encounter, the frequency of follow up encounters, the mix of individual or group services, travel time, and related duties. A general guidance suggested by the Association of State and Territorial Public Health Nutrition Directors for staffing ambulatory care programs serving a nutritionally high-risk target population is 1 direct care nutritionist supervising 2 dietetic technicians per 1,000 registered clients. Alternative ratios range from 1 direct care nutritionist per 500 clients to 1 per 800–900 clients.[10]

The WIC Nutrition Services Committee of the National Association of WIC Directors recommends that each state establish guidelines for staff qualifications and staff ratios for the WIC program.[11] They recommend that the local WIC nutritionists have a graduate degree in nutrition, or be registered dietitians or eligible for dietetic registration. National staffing ratios have not been established.[11, 12] Some states use the figure of 1 nutritionist per 500 WIC registrants, however. If this ratio were applied to the FY 1989 WIC program participation of more than 4,000,000 women, infants, and children, the nation's WIC programs alone would require over 8,000 nutritionists just to meet their current WIC caseload, in contrast to the USDA's most recent count of 3,344.

Public Health Nutrition Personnel Salaries

The comparison of salaries for public health nutrition personnel with those of registered dietitians with a bachelor's degree and other health professionals employed in hospitals and medical centers shows the inequity of salaries in relation to responsibilities[13] (see figure 12.4). These salary deficiencies make it increasingly more difficult to recruit and retain qualified personnel.

Issues Related to Nutrition Personnel in Maternal and Child Health Services in Public Health Agencies

Major current issues regarding nutrition personnel in maternal and child health services in public health agencies are:

1. Insufficient numbers of qualified public health nutritionists. While graduate training with public health

Figure 12.4: Salary (mean) comparisons of nutrition personnel with other health professionals, 1989

	Minimum $	Midpoint $	Maximum $
Public Health Nutrition Personnel[4]			
Public Health Nutrition Consultants	23,941	29,223	34,504
Public Health Nutritionist	21,223	26,027	30,931
Direct Care Nutritionist	18,075	22,924	27,773
Nutrition/Diet Technician	15,432	18,917	22,491
Registered Dietitians[13]			
Hospitals	23,242	27,610	32,570
Medical Schools	21,769	26,034	34,050
Medical Centers	21,937	27,416	32,711
Health Professionals[13]			
Social Workers	23,571	29,189	34,561
Staff Nurses	23,488	29,301	35,330
Professional Nurse Practitioners	28,698	34,987	42,049
Clinical Nurse Specialists	30,221	37,619	44,720

coursework is recommended, the numbers being graduated from the current training programs would not meet the agency demands.

2. Maldistribution of public health nutrition personnel across the nation.
3. Overdependence of official health agencies on the Special Supplemental Food Program for Women, Infants, and Children (WIC) to fund positions for nutrition personnel.
4. Need to improve utilization of Medicaid funding for maternal and child nutrition services, and to implement funding through P.L. 99-457 for nutrition services for handicapped infants and toddlers.
5. Insufficient federal, state and local funding for public health nutrition personnel to provide services for nutrition in health promotion for women of childbearing years, infants, children, and adolescents, and to provide nutrition care for children in need of special health care.
6. Lack of convincing cost-benefit and cost-effectiveness data to demonstrate values of expanded nutrition services and to influence legislators and administrators to fund more positions.
7. Tendency of state personnel systems to downgrade education and experience requirements for public health nutritionists by not requiring public health coursework, and to downgrade required credentials for direct care nutritionists by not requiring eligibility for dietetic registration. In many instances, they accept a degree in home economics as the equivalent of a degree with coursework requirements for dietetic registration.
8. Noncompetitive salaries for public health nutrition personnel, which make it difficult to recruit and retain qualified public health nutrition personnel.
9. Too few readily accessible traditional and non traditional training programs (e.g., off campus and regional degrees) to upgrade the educational credentials of those public health nutritionists and direct care nutritionists who are currently employed.

10. Limited opportunities for career advancement and upward mobility for nutrition personnel in maternal and child health.
11. Insufficient funding to support universities to conduct training and too few stipends to support students seeking master's as well as doctoral training for public health nutrition.
12. No organized network to market public health nutrition and maternal and child nutrition as a challenging career option to be considered by high school and college students.
13. Limited opportunities for nutritionists to obtain training in specialty nutrition care (e.g., perinatal care, adolescent health, and nutrition care for children with handicaps).
14. Too few public health nutritionists with doctoral training for leadership in public health agencies and for employment as faculty in public health nutrition training programs. There is a severe shortage of experienced public health nutritionists who also possess the doctoral degrees to qualify them for appointment to university faculties.
15. Extremely limited funding for applied research in public health nutrition and nutrition in maternal and child health.
16. Too few studies that delineate and validate the most cost-effective staffing patterns and more clearly define appropriate roles, numbers, and mix of public health nutritionists, direct care nutritionists, dietetic technicians, and nutrition aides in various types of public health and community health settings serving mothers and children.

Registered Dietitians in Health Care Facilities

Roles and responsibilities

The American College of Obstetricians/Gynecologists (ACOG) and the American Academy of Pediatrics (AAP) have published *Guidelines for Perinatal Care.*[14] These guidelines specify the requirement for employment of a registered dietitian in Level II and Level III maternal and fetal medicine services in hospitals. Dietitians work with women's health in Level II and III maternal and fetal medicine services in medical centers, teaching hospitals, women's hospitals or community hospitals, and outpatient prenatal clinics. Some private practice dietitians work with obstetricians/gynecologists in private or group practices.

Dietitians are employed in the 150 licensed children's hospitals. These hospitals are required by the accrediting agency to employ one or more registered dietitians.* Dietitians are also employed in the pediatric units of general hospitals. Dietitians in neonatal intensive care units, developmental evaluation centers, retardation facilities, pediatric ambulatory care clinics, health maintenance organizations, and community health centers can coordinate their nutrition care plans with nutritionists working in public health and home health agencies to assure continuous and consistent care. As emphasis on family-centered care increases, and family members are encouraged to manage the care of their high-risk children, there will be an increased need for improved coordination, communication, and consistency among hospital and community nutrition professionals.

Education and training

Registered dietitians are defined by their education and experience credentials. Dietetic registration is intended to assure a minimum standard level of competence in the science and practice of nutrition and dietetics in health and disease throughout the life cycle. Dietetic registration should be a minimum requirement for employment in public and community health agencies as well as in health care facilities providing nutrition care to women, infants, and children. Dietetic licensure laws now passed by approximately half of the state legislatures are essentially based on the dietetic registration requirements.

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* Personal correspondence, B. Spear, Chair, Pediatric Nutrition Practice Group, The American Dietetic Association. December 18, 1989.

To qualify for dietetic registration, applicants must meet requirements established by the Commission on Dietetic Registration, an autonomous body affiliated with The American Dietetic Association. Knowledge requirements for entry-level dietitians are gained through coursework in basic sciences, behavioral sciences, food science, and nutrition science and practice. These courses prepare the entry-level dietitian in knowledge areas specified as Standards of Education in the Council on Education's *Accreditation/ Approval Manual for Dietetic Education Programs.*[15] Building on these Standards of Education, performance requirements for entry-level dietitians stipulate the skills to be developed through an approved or accredited 900 hours of supervised practice. After completing the coursework and supervised practice, eligible candidates must pass a standardized Dietetic Registration Examination. To maintain their registration, dietitians must participate in 75 clock hours of approved continuing education during each five-year period subsequent to passing the Dietetic Registration Examination.

Educational institutions offer several options in dietetic education. Across the United States, more than 250 colleges and universities offer undergraduate academic curricula in dietetics which meet current standards of education set by the Council on Dietetic Education of The American Dietetic Association. In 1988–89 these programs graduated 3,124 students.[5]

Students who have completed this prescribed coursework complete the supervised practice in one of two types of post-baccalauarate programs. There are 98 accredited dietetic internships, usually offered in a university medical center or teaching hospital, which placed 884 interns in 1988–89. The alternate plan for obtaining pre-dietetic registration experience is through 1 of the 41 900-hour Approved Planned Practice Programs (AP4) which could accommodate 346 students in 1988–89.[5] Dietetic internships and AP4 programs together accept less than half of the graduating students who meet The American Dietetic Association's Council on Education Standards of Education.

Coursework meeting knowledge re-quirements is integrated with the 900 hours of supervised practice in academic programs accredited by the Council on Education as Coordinated Programs in Dietetics. There are now 60 of these accredited coordinated programs offering either a bachelor's or master's degree along with eligibility to take the Dietetic Registration Examination. In 1988–89 there were openings for 901 students to enroll in these programs.[5]

In 1989 an estimated 2,437 eligible candidates took the Dietetic Registration Examination, which is approximately the same number that took this examination in each of the past five years.[16] Thus, about 2,400 registered dietitians are added to the professional pool each year.

These education and experience routes to dietetic registration prepare entry-level dietitians as generalists. A study of entry-level dietetics programs including all of the above models found wide variation in the degree to which entry-level dietitians were prepared to work with infants and children, particularly children with handicaps. In general, the study found that the curriculum of the academic programs and coordinated dietetic programs were commonly deficient in course content and experiences or exposure to both normal and abnormal infant development, family and infant assessment, and the appropriate nutrition interventions for handicapped infants.[17] In general, those dietetic education programs associated with University Affiliated Programs for persons with developmental disabilities offered students more in-depth exposure and experience with handicapped children and their families.

Dietitians and public health nutritionists interested in preparing themselves to work in maternal and child health as a specialty must seek postgraduate or fellowship training in maternal nutrition, perinatal/neonatal nutrition, pediatric nutrition, pediatric pulmonary care, adolescent health, metabolic disorders training, or training in nutrition and handicapping conditions. The University Affiliated Programs for persons with developmental disabilities offer interested nutritionists/dietitians opportunities for fellowships of various lengths for training and research in work with handicapped children. Several adolescent health programs throughout the country offer nutritionists and dietitians fellowships to study adolescent nutrition and health in greater depth. Training opportunities in nutrition in women's health include an intensive one-week course in maternal nutrition at the University of Florida and the March of Dimes interdisciplinary teaching package in maternal nutrition now being implemented throughout the country for dietitians and nutritionists along with physicians and nurses.[18]

Dietetic Workforce

There are currently 48,745 (1989) registered dietitians in the United States.[16] Areas of practice identified in a 1986 survey of American Dietetic Association members found that 37 percent of the dietitians were employed in clinical dietetics in hospitals. About 25 percent were employed in management positions, 18 percent in consultation or private practice, 12 percent in the community (which presumably includes nutritionists employed in public health agencies), and 10 percent in education and research in universities or schools. The remaining members surveyed were not currently practicing dietetics.[16]

Bureau of Labor statistics indicate that there were 40,200 jobs for dietitians in 1986. They project 53,800 jobs available for dietitians in the year 2000. The move to out-of-hospital services is expected to produce a modest shift of employment to ambulatory clinics, but no significant change in total numbers of dietitians employed.[19] The available literature does not discuss the potential for increased employment of dietitians in home care for children, or in private or group practice with obstetricians or pediatricians. It does suggest that some specific duties of dietitians could be performed by nurses, health educators, or pharmacists.[19]

Because there is no dietetic practice group in The American Dietetic Association that relates to women's health, no assessment can be made of numbers in relation to need. There are currently 1,836 members in The American Dietetic Association (ADA) Pediatric Nutrition Practice Group.* Most are employed in children's hospitals, and some are employed in pediatrics in general hospitals. These numbers reflect some overlap with the 1,300 members in the Public Health Nutrition Practice Group and other ADA practice groups.

Another American Dietetic Association practice group includes members involved in dietetics in developmental and psychiatric disorders. Their 1989 membership directory lists 138 members with interests in developmental disabilities and 29 with interests in mental retardation.[20] There again is some overlap in membership in practice groups.

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* Personal correspondence, B. Spear, Chair, Pediatric Nutrition Practice Group, The American Dietetic Association. December 18, 1989.

The dietetic practice groups, such as the three named above, serve as a professional support system which sets professional practice and quality assurance standards, builds networks, and addresses continuing education needs for practicing dietitians. There is a growing interest among the practice groups for setting a research agenda.

In The American Dietetic Association, there is discussion about establishing specialty board certification. Such certification would establish standards for advanced levels of practice and research beyond those required for dietetic registration. Given the strong pediatric and public health nutrition practice groups, these would be likely areas of specialization.

Issues related to dietetic personnel serving mothers and children

Major current issues related to dietetic personnel serving mothers and children include:

1. Inadequate data base to document the number of registered dietitians with specific responsibilities in nutrition in women's health, and in infant, child, and adolescent health. (The American Dietetic Association conducted a membership survey in spring 1990 to track employment by practice area which may provide some of these needed data.[16]) It would be useful to identify and categorize the numbers and locations of dietitians working in maternal and child health short- and long-term health care facilities, private practice, school food service or nutrition education, educational institutions, and in public health agencies. It would also be useful to document their basic and continuing educational preparation for their specialty area.
2. Insufficient content in maternal and child nutrition in health and disease included in the basic didactic and practice preparation for entry-level dietitians and in the Dietetic Registration Examination.
3. Too few inservice education and continuing education opportunities to better prepare dietetic educators to incorporate more content in maternal and child nutrition into the basic entry-level dietetics curriculum.
4. Job opportunities in maternal and child health not clearly included in career guidance of prospective dietitians.

Other Health Professionals

Physicians

Obstetricians/gynecologists and pediatricians both in public health and private or group practice take on significant responsibilities in nutrition assessment, counseling, and followup for their patients. "Maternal and Newborn Nutrition," chapter 7 of the ACOG/AAP *Guidelines for Perinatal Care,*[14] specifies that "during the initial or later prenatal visits a pregnant woman should be asked about her food intake." It also specifies that "any major or potential nutritional risk factors should be identified," presumably by the obstetrician, who, as necessary, refers patients to a registered dietitian or nutritionist. The nutrition content of preconceptional and prenatal care is stressed for every prenatal visit in *Caring for Our Future: The Content of Prenatal Care.*[21] The prenatal care provider is responsible for assessing nutrition risk and providing nutrition care. The prenatal care provider is not named by discipline in this publication, but would appear to be a physician and/or nurse practitioner, hopefully with backup by a nutritionist or dietitian. The American Academy of Pediatrics has published the *Pediatric Nutrition Handbook*[22] and *Guidelines for Health Supervision II*[23] to assist pediatricians in providing nutrition care for clients. Both of these publications specify the role of the pediatrician in counseling parents about feeding and nutrition.

In addition to obstetricians and pediatricians, family practice or general practice physicians provide prenatal, infant, and child health care. These physicians should be made aware of and utilize the professional guidelines of the specialty groups.

In a 1985 survey of nutrition education in U.S. medical schools, a committee of the Food and Nutrition Board of the National Research Council, National Academy of Sciences found that, while two-thirds of the medical schools taught some nutrition principles in their first year courses, only one-fifth taught nutrition as a separate, identifiable required course. An average of 21 classroom hours were devoted to nutrition in the life cycle, with 60 percent of surveyed schools teaching less than 20 hours. The number and distribution of hours devoted to nutrition in clinical rotations could not be determined. Of 6,000 questions used in the pool for physician board certification examinations, only 3 to 4 percent related to nutrition. In making a case for teaching more nutrition in the medical school curriculum, the committee cited areas of emphasis which included nutrition and weight gain in relation to the outcome of pregnancy, competent counseling on breastfeeding, and responsibilities of the physician in infant nutrition and nutrition care of children with genetic disorders. This National Academy of Sciences report recommends a designated nutrition course in the preclinical medical school curriculum and the integration of applied nutrition content into clinical clerkships. In obstetrics/gynecology, pediatrics, and family practice where nutrition is an essential part of practice, nutrition principles should be part of residency training.[25]

Issues for physicians related to nutrition in maternal and child health:

Major current issues for physicians which are related to nutrition in maternal and child health include:

1. Integrating theoretical and practical maternal and child nutrition into the already crowded medical curriculum. There are no stipulated qualifications for nutrition faculty in obstetrics or pediatrics in medical schools. There is a need for more effective use of academically qualified registered dietitians in medical education.
2. Lack of understanding among obstetricians and pediatricians of the role, contributions, and qualifications of nutritionists and dietitians.
3. Deciding the appropriate team approach to nutrition care and determining the cost-effectiveness of care provided by physicians versus other qualified health professionals.
4. Determining how to attract obstetricians and pediatricians to participate in continuing education in maternal, infant, or child nutrition including nutrition care of children with special health care needs.
5. Generating funding sources for faculty to teach nutrition in schools of medicine.
6. Providing special training in nutrition–and nutrition services for mothers and children–for public health physicians in schools of public health, so that they are more aware of the overall nutrition services needed by of the entire maternal and child health population, rather than just those who are eligible for WIC.

7. Increasing research in nutrition in maternal and child health in schools of medicine and schools of public health.

Nurses

Nurses represent the largest single health discipline and the one to whom patients or clients frequently turn as approachable sources of health information. There is currently a severe shortage of registered nurses in relation to the demands of hospitals, long-term care facilities, and public or community health agencies. The Bureau of Health Statistics and other sources indicate that approximately 1,406,000 registered nurses were employed in 1986 and project that 2,018,000 will be employed in the year 2000 (a 44 percent increase).[25] In 1984, the American Nurses Association estimated that 68 percent of employed nurses worked in hospitals, 7 percent in public health or community health agencies, 7 percent in ambulatory care, and 18 percent in other areas. A very small number, approximately 2 percent, were nurse practitioners or nurse clinicians.[25] While nursing education has undergone tremendous changes in recent years, in 1984, 42 percent of nurses were still graduates of three-year diploma programs, while 25 percent had completed a two-year associate degree, 27 percent had completed a bachelor's degree nursing program, 6 percent had a master's degree, and 0.3 percent had doctorates. Because of the demands on the curriculum, relatively few nursing schools offer a course solely on nutrition or nutrition and diet therapy. Most integrate nutrition into basic science and nursing coursework. The nutrition content may be taught by a registered dietitian or a registered nurse. Nutrition for mothers and children may be included in life cycle or growth and development courses.

In hospitals, ambulatory clinics, private medical practices, and public health agencies, nurses frequently serve as the case manager or care coordinator, or "gatekeeper." They most often determine client or patient needs for care, including nutrition care. This is particularly important in ambulatory care or public health settings serving mothers and children where nurses usually provide nutrition screening and counseling to low-risk clients and take responsibility for referring higher-risk clients to a nutritionist or dietitian, where one is available. Where a nutritionist or dietitian is not employed, nurses may be responsible for whatever nutrition care is provided. In some WIC programs nurses are employed to provide the nutrition risk certification and nutrition education.

While public health and community health nurses traditionally considered nutrition care for low-risk clients to be part of their role, the shortage of nurses, their changing roles, increased responsibilities, and limited educational background in nutrition, reduce the time and interest most nurses have for providing or arranging nutrition care for maternal and child health clients.

Issues for nurses related to nutrition in maternal and child health

Major issues concerning nurses related to nutrition in maternal and child health include:

1. The need for current data on the status of nutrition in curricula for nursing education, particularly on the quantity and quality of content on nutrition in maternal and child health and the qualifications of those who teach it.
2. The need for information on how nurses view their role in nutrition care in the various aspects of maternal and child health and how well prepared they are to assume this role.
3. The need for reconsideration of qualifications for nutrition educators in nursing education programs.

4. The need for better understanding by nurses of the role and contribution of the nutritionist and dietitian in maternal and child health care.

Certified Nurse-Midwives

There are approximately 4,000 certified nurse-midwives in the United States, serving approximately 5 percent of the pregnant population. Although nurse-midwives work with women at all socioeconomic levels, they work most often with underserved populations in both rural and urban areas.

Twenty-nine educational programs graduate approximately 250 nurse-midwives each year. Core competencies specified by the American College of Nurse-Midwives include nutrition assessment of the maternal-fetal unit, nutrition counseling during pregnancy, and nutrition needs during the puerperium. Nurse-midwives reinforce the counseling provided by the nutritionist when they work as part of an interdisciplinary team. They are prepared to provide nutrition counseling as a component of routine patient care when a nutritionist is not available.

Summary

Limited data are available on the roles, responsibilities, numbers, and qualifications of those health care professionals who are currently delivering nutrition services. This chapter summarizes the information that is available. The public health nutritionist is uniquely qualified to plan, direct, and coordinate nutrition services as components of health care systems. The direct care nutritionist is educated to counsel parents, caregivers, teachers, and children about appropriate diet for optimum growth and development. If they are to participate actively in the delivery of nutrition services, physicians nurses, and teachers need much more preservice and inservice education in nutrition, as well as continuing consultation from a qualified nutritionist. Since nutrition is a vital element of health promotion and disease prevention, the national organizations concerned with mothers and children should agree on recommendations that sufficient qualified nutrition personnel be employed in maternal and child health programs.

Recommendations Regarding Personnel for the Delivery of Nutrition Services

1. Agreement and endorsement is needed from the conference participants who represent major organizations of national policymakers, administrators, and leaders in maternal and child health that adequate nutrition services are needed and should be planned, directed, and coordinated by a qualified public health nutritionist.
2. Recognizing the essential contributions of nutrition to pregnancy outcome, the physical and mental development of all infants and children, and the particular needs of those at high nutrition risk because of genetics, income, ethnicity, or health status, there needs to be an organized, consistent approach to staffing nutrition services in public health/community agencies, health care facilities, schools, and day care facilities considering roles and responsibilities, and establishing standards for qualifications, numbers, and ratio of nutrition, allied, and public health professional and paraprofessional personnel.
3. Minimum standards must be established for nutrition in the curriculum in maternal and child health for educational programs preparing physicians, nurses, health educators, and administrators, as well as for public health

nutritionists, registered dietitians, and dietetic technicians.

4. Incentives are needed to attract and recruit more talented students into careers in nutrition and dietetics, including both support for their training at the undergraduate and graduate levels, and more competitive salaries to retain qualified personnel once they are trained. Agency/university collaboration is needed to provide innovative summer experiences for high school and college students, as well as training positions with stipends for graduate study.
5. Qualifications for faculty for all of the above programs need to be established and training funds made available to support doctoral training in public health nutrition and training in the subspecialty areas in maternal and child nutrition.
6. Two conferences of particular relevance to this subject have been held supported by DHHS MCH Title V and Health Manpower Training funds. The first was the Workshop on Training Nutrition Personnel for Public Health Programs: Needs, Issues, and Directions, held in February 1984. Proceedings from this conference must be carefully studied and the most pertinent recommendations considered for reaffirmation and funding for implementation.[26]

These recommendations include:

- Validation of personnel standards in *Personnel in Public Health Nutrition for the 1980s* (or its anticipated version);
- Implementation of an approval mechanism for graduate public health nutrition programs based on new curriculum recommendations;
- Expansion and revision of graduate public health nutrition programs based on new curriculum recommendations;
- Expansion of public health nutrition faculty;
- Update of continuing education for public health nutrition personnel; and
- Training for nutrition in health promotion.

A second conference held in October 1987 focused specifically on Doctoral Training Programs in Public Health Nutrition.[27] The recommendations from this conference, which are listed below, must be studied for funding and implementation if community nutrition services in maternal and child health are to be expanded and improved. These recommendations include the following:

- Design, pilot, and evaluate new types of doctoral programs in public health nutrition to provide:
  1. Breadth of knowledge in nutrition in health promotion, disease prevention, risk reduction, and nutrition support of disease treatment;
  2. Core courses in public health at an advanced level;
  3. Competencies in research and evaluation, teaching, administration, and management;
  4. Emphasis on written and oral communications and leadership skills in both primary and secondary data analysis and interpretation;
  5. Piloting of doctoral programs in three different ways—the first an enhanced program in a single school, the second, a program in an academic consortium, and the third, a unique program for working professionals as a nontraditional program with a year of concentrated study combined with weekend, once-a-month, and/or summer study. The dissertation in this nontraditional program would be based on original population-oriented research;

- Establish program to exchange personnel between the public health and academic communities;
- Prepare a directory or inventory of existing available funding resources for applied research in public health nutrition; and
- Recommend earmarked funds for public health nutrition research either from the public or private sector.[27]

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Financing Nutrition Programs

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Financing nutrition programs and services for mothers and children involves obtaining and utilizing public and private funding sources, including grants, contracts, third-party reimbursement, and payments for products and services.[1] Since health care financing is presently receiving a great deal of national attention, it is essential for nutrition administrators to keep up with changes relevant to financing nutrition programs and services.

The most frequently used sources of funding for state and local nutrition programs include the federal health block grants to states, the Special Supplemental Food Program for Women, Infants, and Children (WIC), and state revenues. An increasing source of funds is reimbursement for services through public and private insurers.[2] Federal discretionary grants, particularly from agencies of the U.S. Department of Health and Human Services (DHHS), the U.S. Department of Agriculture (USDA), and to some extent the Department of Education (DOE) are traditional and useful sources. Many federal discretionary grants not specific to nutrition can include nutrition activities as part of a broader program. These grants, as well as state discretionary grants, could be utilized creatively to include nutrition personnel and services more often than they have been in the past. Private foundations that have traditionally funded public health activities, as well as those that have recently placed greater emphasis on social rehabilitation projects, are sources that have not begun to be tapped fully for nutrition activities. This paper will briefly describe many of these resources for nutrition services.

Federal Funding Sources

Federal block grants, U.S. Department of Health and Human Services

The Maternal and Child Health (MCH) Block Grant has routinely been used to pay for state and local public health nutrition personnel, local clinical nutrition services, and positions for dietitians in newborn intensive care units or specialty clinics such as metabolic disorders clinics. Although the MCH Block Grant Program has funded fewer state and local public health nutritionist positions in maternal and child health programs in recent years, it has funded an increased number of nutritionist positions in state programs serving children with special health care needs (CSHCN). With greater emphasis by state Title V programs on providing statewide leadership in maternal and child health, it is logical for Title V programs to fund state-level nutritionist positions to provide leadership and direction in nutrition services for mothers and children. Such positions allow state Title V programs to look at broader nutrition needs of mothers and children than those identified for the WIC program.

The Preventive Health and Health Services Block Grant has, in some states, funded state and local nutritionist positions to provide nutrition services as part of a health promotion program.

The Primary Care Block Grant has financed Community Health and Migrant Health Center nutritionist positions and contracts for nutrition consultation from hospital dietitians and public health or private practice nutritionists. The Omnibus Budget Reconciliation Act of 1989 provides for reimbursement of 100 percent of reasonable costs of all covered ambulatory services for Medicaid recipients delivered in federally qualified health centers. This may allow for expansion of nutrition services in these facilities.

Other block grants that have been used to a more limited extent for nutrition services include the Social Services or Title XX Block Grant which has, for example, provided for nutrition training of day care personnel; the Alcohol, Drug Abuse and Mental Health Block Grant which has funded clinical nutritionist positions, and the Community Services Block Grant which funds community food and nutrition programs, usually directed at emergency situations.

Funds from other block grants can be transferred to the Maternal and Child Health Block Grant activities. This option has seldom been utilized, however.

Other federal grant programs

The Special Supplemental Food Program for Women, Infants and Children, U.S. Department of Agriculture. This program provides nutritious foods, nutrition assessments, and nutrition education to eligible clients. Although many state and local nutritionist positions are funded through this program, their services are usually restricted to the WIC-eligible population, and comprehensive nutrition services are seldom provided.

Title X Family Planning Program, Office of Population Affairs, DHHS. A few Title X family planning programs fund grantee nutritionist positions, particularly where the grantee is a state health department. Some family planning programs provide nutrition information to clients as part of their clinical services, and some programs contract for nutrition consultation to provide continuing education to nursing and counseling personnel.

Early Intervention Program (0–2), U.S. Department of Education. The Education of the Handicapped Act Amendments of 1986 authorized an early intervention program which provides grants to a lead state agency (generally health, education or mental health) to assist states in developing statewide comprehensive, coordinated, multidisciplinary, interagency systems to provide early intervention services to handicapped infants, toddlers, and their families. Nutritionists are identified as personnel qualified to provide these services.[3] Examples of nutrition activities funded through this program include nutrition assessments and counseling of clients and their families, community demonstrations of the provision of nutrition services to the 0–2 handicapped population, training of health personnel to provide nutrition services to handicapped infants and toddlers, and development of nutrition resource directories.

Head Start Program, Agency for Children, Youth and Families, Office of Human Development, DHHS. This preschool program requires the services of a nutritionist to oversee the food service, nutrition, and health component and nutrition education of children, teachers, and parents. In programs that do not have staff nutritionists, health departments could contract to provide some or most of the necessary services.

Some state and local health departments are taking advantage of an interagency agreement between the U.S. Public Health Service and the Office of Human Development to obtain travel funds to support public health nutrition staff in providing consultation to Head Start Centers as part of the Head Start Health Consultation Network.

As day care programs begin to receive more federal/state financing, state and local nutritionist positions and consultation services may be supportable, as may training of staff to improve the nutrition services in day care centers.

Programs such as the State Cooperative Extension Service, the Expanded Food and Nutrition Education Program (EFNEP), the Nutrition Education and Training Program (NET), the School Lunch, Breakfast and Summer Food Programs and the Food Stamp Program all benefit many mothers and children but are generally not sources of financing for public health nutrition services. Coordination and cooperative planning with these programs is essential to maximize their benefits to mothers and children.

Discretionary federal grants

Federal legislation allows for discretionary grants in many federal programs. Information on the discretionary grants and requests for applications (RFAs) are published in the Federal Register. Identifying a contact to screen and refer nutrition related RFAs on a timely basis is essential to utilizing these funds. Including nutrition activities or services as an integral part of broader-based discretionary grants is an increasingly important key to obtaining funding for nutrition activities. Examples of recent discretionary grants that either support or could have supported nutrition activities follow.

Special Projects of Regional and National Significance (SPRANS), MCH Bureau, Health Resources and Services Administration (HRSA), DHHS. Special MCH improvement projects provide an opportunity each year for nutrition-related demonstrations to improve the health of mothers and children, including children with special health care needs. Similarly, training projects often provide an opportunity for continuing education in nutrition and related nutrition service that is of regional and national importance. A listing of nutrition related SPRANS grants can be found in the reference *Nutrition, Selected SPRANS Abstracts FY 1988.*[4]

Office of Community Services, Family Support Administration, DHHS. Discretionary authority under the Human Services Reauthorization Act of 1986 provided for the development of innovative approaches at the state and local level to meet the nutrition needs of low-income people.[5] These funds have been used to increase nutrition education and information services to Head Start programs and to provide training in food and nutrition to Head Start parents.

Food and Nutrition Service, USDA. Discretionary grants have supported such programs as nutrition education of food stamp recipients and projects to increase breastfeeding among WIC recipients.

The National Cancer Institute, National Institutes of Health (NIH), DHHS. Funds have been made available for a range of studies and demonstrations to determine effective and efficient ways to promote dietary change in the community that would result in cancer risk reduction.

The Office of Human Development Services, DHHS. In 1988, a Coordinated Discretionary Fund Program was established by combining funds from several administrations.[6] Several priority areas focused on new approaches to deal with improving the quality of life for children, youth, and families, including children with disabilities.

The Centers for Disease Control (CDC), DHHS. CDC supports nutrition surveillance systems for mothers and children, as well as community-based programs for cardiovascular disease risk reduction.[7] With the establishment of the Center for Chronic Disease Prevention and Health

Promotion, additional discretionary grants are to be expected. Grants relating to prevention of chronic disease should be seen as relevant to adolescents as well as to adult MCH populations.

The Alcohol, Drug Abuse and Mental Health Administration, DHHS. In 1989, the Office of Substance Abuse and Prevention established demonstration grants for the development of model projects on substance abuse prevention, education and treatment of pregnant and postpartum women and their infants.[8] Relevant nutrition services could be included in these projects.

State and Local Resources

State and local public revenues can be utilized to fund generic components of a nutrition program including administrative nutritionist positions, nutrition surveillance systems, and quality assurance systems.[9]

State and local entities often have discretionary funds that may be used to support nutrition activities. These funds have been used for activities such as expansion of the WIC program to serve additional eligible women and children and expansion of prenatal care programs to include a nutrition component to serve more low-income women.

Third-Party Reimbursement

In recent years, reimbursement for nutrition services by public and private third-party payers has become an important source of financing for local nutrition services. Important sources for the MCH population include Medicaid, Blue Cross/Blue Shield, Supplemental Security Income, state programs for children with special health care needs, Workers' Compensation, and commercial carriers.[2] Although coverage of nutrition services varies from payer to payer and often from state to state, some generalizations can be made. Keys to reimbursement for clinical nutrition services include identifying services that are or could be billable to the various third-party payers; having a documented physician referral or determination of medical necessity of the service; utilizing acceptable terminology; utilizing an appropriate provider number, often a physician or provider organization number, although for some carriers the dietitian can use her/his own provider number; establishing fee schedules; and documenting that the service is provided.[10–12] Important to the success of the process is working closely with the payer and referring physicians and, in the hospital or clinic setting, the administrative and financial departments. Documenting nutrition services to be cost-effective and efficient may encourage reimbursement.

Although Prospective Payment has affected many hospitals, to date children's hospitals have not been included in national prospective payment systems. Recently, however, a pilot project that bears watching has been established on prospective payment for pediatric departments. For inpatient care, some payers have established all inclusive per diem rates for hospitals which cover all needed inpatient clinical services. Other private insurers and health maintenance organizations have developed contractual agreements with hospitals to reimburse specific inpatient nutrition services such as nutrition assessment, computerized nutrient analysis, special nutrition products designed for therapeutic purposes and prescribed nutrition counseling.[12]

Medicaid/Early and Periodic Screening, Diagnosis, and Treatment (EPSDT)

Recent changes in Medicaid legislation affecting the MCH population necessitate special attention focused on this program.[13–15] The Medicaid program is the largest single source of health care financing for the poor.[16] It pays providers for a range of inpatient and outpatient medically related services to low-income adults and children. Since it is a state-based program, covered groups and reimbursable services are determined by the state within broad guidelines required by federal legislation. Congressional interest in the Medicaid program (stemming from a concern over high infant mortality rates in the United States) may result in additional changes in mandatory and optional coverage. These changes bear close monitoring. Nutritionists providing consultation to state Medicaid agencies could help shape additional changes in the program—for example, getting state plans and regulations changed to recognize the registered dietitian as a provider of EPSDT/Medicaid services.

Eligibility for Medicaid has been expanded to allow states to cover infants (0–12 months) and pregnant women with incomes up to 185 percent of the federal poverty level, and children up to age eight under 100 percent of the federal poverty level. Pregnant women may begin receiving prenatal services if presumed to be eligible for Medicaid.[13] Effective April 1, 1990, states were required to serve pregnant women and children under six years of age in families with incomes below 133 percent of poverty. Pregnant women who qualify for Medicaid under these "percent of poverty" guidelines remain eligible for up to 90 days of postpartum coverage. Some states have expanded coverage to poor women and children with even higher incomes by utilizing state-only funds.

Women who qualify for Medicaid based upon their receipt of cash assistance receive full Medicaid benefits as defined in the state Medicaid plan. Women who qualify based upon their pregnant state and the poverty-related income levels qualify only for "pregnancy related services." There is no special restriction on Medicaid benefits available to children in these groups.

States have used Medicaid freedom-of-choice waivers to provide a variety of services such as nutrition, social work, and health education in their benefits as a part of clinic services and have set higher reimbursement rates (see figure 13.1).[14] Medicaid expansions allow a state to maximize federal resources for services that otherwise would be primarily state-financed. States with an overmatch for MCH dollars could use the overmatch to leverage more Medicaid dollars.[17] States may also certify only those clinics that meet provider qualification standards and can selectively contract with hospitals to provide care.[13] This process is similar to the preferred provider organization (PPO) relationships that have developed in the private sector.

Early and periodic screening, diagnosis and treatment (EPSDT) for children under 21 years of age is a mandatory Medicaid service. Providers can be paid for nutrition screening, assessment and related counseling as EPSDT services.[11] EPSDT rules were changed significantly by OBRA '89, and the changes were effective April 1, 1990. For children under age 21, states now *must* cover all services allowed under Medicaid to correct or ameliorate defects discovered by screening services. Screenings at intervals outside the periodicity schedule must be permitted, and screenings must include coverage of blood tests and health education. In addition, states may no longer limit participation in EPSDT to providers who can provide *all* services. Providers can participate even if they can provide only one service, thus allowing nutritionists/dieticians to be providers if the state so decides. Different benefit packages can be developed for subgroups such as adolescents who are pregnant, substance abusing, or have other health care problems; children with chronic illness or on Supplemental Security Income benefits; chil-

Figure 13.1: Medicaid enhanced prenatal care services, January 1990

	CARE COORDINATION/ CASE MANAGEMENT	RISK ASSESSMENT	NUTRITION COUNSELING	HEALTH EDUCATION	PSYCHOLOGICAL COUNSELING	HOME VISITING	TRANSPORTATION
Alabama	X	X				X	
Alaska	X	X	X			X	
Arizona							
Arkansas	X	X	X	X	X	X	
California	X	X	X	X	X		
Colorado							
Connecticut		X		X		X	
Delaware	X	X	X	X	X	X	
D.C.							
Florida							
Georgia	X	X					
Hawaii							
Idaho	X		X		X	X	
Illinois							
Indiana							
Iowa	X	X	X	X	X		
Kansas		X	X	X		X	
Kentucky							
Louisiana							
Maine							
Maryland	X	X	X	X	X	X	
Massachusetts	X	X	X	X	X		
Michigan	X	X	X	X	X	X	X
Minnesota	X	X	X	X	X	X	
Mississippi	X	X	X	X	X	X	X
Missouri	X	X					
Montana							
Nebraska							
Nevada							
New Hampshire	X	X	X	X	X	X	
New Jersey	X	X	X	X	X	X	
New Mexico	X						
New York	X	X	X	X	X	X	
North Carolina	X	X		X		X	
North Dakota							
Ohio	X	X	X	X	X	X	
Oklahoma							
Oregon	X	X	X	X		X	
Pennsylvania	X	X	X	X	X	X	
Rhode Island							
South Carolina	X	X	X		X		
South Dakota							
Tennessee	X	X				X	
Texas							
Utah	X	X	X	X	X	X	
Vermont	X					X	
Virginia	X	X	X	X		X	
Washington	X	X	X	X	X	X	X
West Virginia							
Wisconsin							
Wyoming							
TOTAL	28	27	22	21	18	23	3

Source: National Governors' Association, January 1990.

dren from 0 to 3 years of age; or children in foster care, state hospitals, residential facilities, or criminal justice facilities.[13]

Medicaid funds can also pay for targeted case management. There has been an increasing emphasis on case managers to coordinate care and serve as "gatekeepers" of health care.[15] It is essential to work closely with case managers to assure that they are aware of the value and appropriateness of nutrition services. When Medicaid or other payers pay for case management services, and when nutrition care is of major importance to the patient/client, it might be beneficial for nutritionists to serve as case managers.

Employer Health Promotion Programs

In recent years, many large employers have established preventive health education programs, often called fitness or wellness programs, as a part of employee health benefit packages. Executives see this type of program as a way of both decreasing spiraling costs of health care for their employees and increasing employee productivity. Nutrition services, including employee education, counseling, and food services, may be included. Nutritionist positions to develop and supervise the nutrition component of the health education program may be included as well. Health department nutritionists as well as consulting dietitians have contracted to provide these services. An innovative health department nutritionist might serve as a broker for a consultant fee to help develop these services, then bring in a private consultant to actually provide the services. It would seem reasonable that a public health nutritionist, trained to identify nutrition service needs and gaps in services in a community, might serve a broker role in many instances, not just in relation to employee health services.

Self-Pay for Health Services and Materials

In recent years, many public health agencies have begun to charge for services and products. Charges made for clinic services and educational classes are generally based on a sliding fee schedule. Prenatal, child nutrition, fitness, weight control, and therapeutic nutrition classes are examples of such endeavors. Development and sale of educational materials and cookbooks to the general public or population segments have also been fruitful activities. To take advantage of the public's increased interest in nutrition, marketing of nutrition services and products has become an essential skill for public health nutritionists.

Private Foundations

Foundations are established to fund, generally through a grant process, activities related to the objectives and interests of the foundation. Foundation funding for public health activities has increased substantially since 1980. Foundations are generally more flexible than governmental agencies in the use of their funds and often require less red tape and less reporting. To utilize foundation funds efficiently, it is essential to know the foundation's area of interest, its objectives, its capacity to give a grant in the needed amount, and how it operates.

Information on foundations, including the types of grants they provide, the types of recipients they serve, the size of their grants, their location, their limitations on funding ,and a contact for more information can be obtained through public and college libraries. Important references include *The Foundation Grants Index, The Foundation Directory*, and *Source Book Profiles*. Foundations have established an independent, nonprofit organization, the Foundation Center, to provide information to grant seekers. Foundation Center offices are located in New York City, Washington, DC, Cleveland, and San Francisco.[18] The Center has ties with cooperating libraries in most states. The Center provides orientations on how to use its facilities and has guides and brochures helpful to grant seekers. Some health agencies have an inhouse resource to identify relevant funding sources that can be tapped for information on nutrition-related grants.

Examples of projects funded by foundations are described later in the section of this paper addressing funding sources for adolescent health programs. Another example is the Chicago Community Trust's Health Care Initiative to stimulate planning and demonstration projects for the delivery of health care to the medically indigent.[19]

Voluntary Organizations

Many voluntary health organizations carry out nutrition-related educational and service projects. Working with these programs to utilize their resources effectively for the maternal and child health population is an efficient method of meeting program needs without directly receiving funding or being responsible for carrying out the program functions. Relevant organizations include the American Heart Association, American Cancer Society, American Diabetes Association, and the March of Dimes Birth Defects Foundation.

Civic Organizations and Clubs

Services clubs, women's auxiliaries, and local religious groups often support worthy causes that might lend themselves to nutrition activities, such as educational programs, the development and printing of educational materials, nutrition screening, and health fair-type projects. The Junior Chamber of Commerce chapters emphasize volunteer activities which a nutritionist might utilize as a mechanism for accomplishing worthwhile activities that could not be accomplished within the agency's resources.

Examples of Financing Services for Specific Populations

Children with special health care needs

Many health care resources, such as the EPSDT program, are generally available for children, including special needs children. Other resources are targeted specifically to the child with special health care needs.[20]

MCH Block Grant—Children with Special Health Care Needs. This program provides assistance to children who are in need of special health care services by providing and promoting family-centered, community-based, coordinated care and facilitating the development of community-based systems of services for such children and their families. States determine the specific conditions which are eligible for CSHCN services. This program has funded nutritionist positions and nutrition counseling services for eligible children, especially those in specialty centers such as metabolic disease clinics or state-operated clinics for handicapped children, but also those in outpatient departments, local hospitals, home health agencies, health departments, or private practice settings serving handicapped children. In recent years, this program has funded an increased number of state nutritionist positions to provide guidance and direction and to set nutrition standards for the program for children with special health care needs.

The Supplemental Security Income—Disabled Children (SSI-DC). This program is part of the MCH Block Grant Program and is generally included in the program for children with special health care needs. The SSI-DC program provides rehabilitation services for blind and disabled individuals under 16 years of age receiving benefits under Title XVI of the Social Security Act.

Private health insurance. Private health insurance is a major provider of health services to children through parents' private insurance or as dependents of employed parents. Unfortunately, it has traditionally provided limited preventive health care and health counseling, but may pay for outpatient nutrition assessment and counseling if determined by the physician to be medically necessary and if provided by a physician or qualified nutritionist, usually a registered dietitian. Many children with severe and long-term conditions are not covered by private health care insurance.

States have sometimes mandated coverage of specific services for certain population groups. For example, Massachusetts has required group policies with dependent coverage to include special medical formulas for infants and children with six different metabolic disorders, covering them through the age of dependency. Several states have mandated or urged coverage of reimbursement for outpatient diabetes self-management education programs. Massachusetts and Maine have mandated benefits for cardiac rehabilitation, which includes nutrition education. Thirty-four states, according to a recent Blue Cross survey, have mandated that handicapped and financially dependent young adults can remain on their parents' policies.[21]

Medicaid. States may expand Medicaid benefit packages for special needs children by amending the state plan to make expanded coverage accessible to all Medicaid recipients who meet medical necessity criteria or can restrict the package to the EPSDT population. States may lift limits on amount, duration, and scope of already covered services and can introduce new benefits such as ancillary therapies, new categories of clinic services or case management.[17] The Tax Equity and Fiscal Responsibility Act (TEFRA) of 1982 allowed states to extend Medicaid eligibility to certain disabled children under 18 years of age who would otherwise be eligible only if they were institutionalized. These children can receive a variety of services that might be relevant to meeting their nutrition needs, such as physical therapy, occupational therapy, in-home nursing services, and special medical equipment.[13]

Some state Medicaid home health programs cover nutrition care when related to the medical condition of the beneficiary.[22] The cost may be included under administrative costs, however. Several states require Medicaid-participating nursing homes to employ or contract with a dietitian to provide nutrition care services.

Education of the Handicapped Act Amendments of 1986. Nutrition services may include assessment, development of nutrition care plans, referrals to community agencies, and nutrition services defined in the nutrition plans. For additional information on this important resource for handicapped children, see earlier discussion.

University Affiliated Centers (UACs). These centers, which are partially Title V funded as special projects of regional and national significance, provide training for health professionals in care of the mentally retarded and handicapped, as well as diagnosis and establishment of care plans for patients selected for training purposes. Nutritionists are part of the multidisciplinary training faculty and provide assessment, care planning, and limited nutrition services for clients. University Affiliated Center faculty can provide continuing education to health professionals and others serving children with special health care needs, as well as consultation to state and local programs and personnel serving these children. UAC nutritionists have recently been involved in providing consultation and training to those working with early intervention programs for infants and toddlers.

MCH Special Projects of Regional and National Significance (SPRANS). Many SPRANS projects, both training and demonstration, directed toward children with special health care needs have supported nutritionist positions or nutrition services. In addition to the UACs, other training programs with nutrition components include Perinatal-Neonatal Pediatric Nutrition Training and Metabolic Disorders Training. The Pediatric Pulmonary Centers and the Juvenile Rheumatoid Arthritis Projects provide training as well as service. There are three short-term SPRANS on nutrition training for health professionals caring for children with special health care needs. Faculty of all these programs can provide consultation and continuing education on nutrition needs and services for children with special health care needs.

Examples of recent SPRANS demonstrations for CSHCN which funded nutritionist positions or services include: Demonstration of a Regional Nutrition Program for Handicapped or At-Risk Children (University of Iowa, Iowa City, Iowa), Development of a Model System of Nutrition Services for Children with Disabilities (New Mexico Health and Environment Department, Sante Fe, New Mexico), and Development of a Model System of Nutrition Services for Children with Disabilities (New York State Department of Health and Health Research, Inc., Albany, New York).[4]

Adolescents

The severity of morbidity and mortality of adolescents in the United States is receiving increasing recognition. Although nutrition may not be among the high-priority health problems of adolescents, it is important in terms of the pregnant adolescent and the adolescent with chronic disease or developmental disabilities. Many of the "new morbidities," such as substance abuse, AIDS, and eating disorders, place the adolescent at nutrition risk. Adolescence is also a time for concern about dietary habits in relation to the development of diet-related chronic diseases such as diabetes, hypertension, and coronary heart disease.

Sources of possible reimbursement for health and nutrition services for adolescents include the following: Medicaid, parents' private insurance, student health insurance, employment-based insurance, and Blue Cross/Blue Shield.[2] Plans and coverage vary. For relevant information on Medicaid/EPSDT, see the earlier description. Many of the programs that serve children, described under earlier sections, can serve the adolescent population. Recent innovative demonstration projects have insured the school-age population by utilizing school districts as the "employer" to cover students. Further such demonstrations are expected.

Some federal programs and foundations have targeted projects to meet the needs of adolescents. A few examples are described below.

Title V funding has supported programs for adolescents through MCH Block Grants and SPRANS grants. MCH Block Grant funds, in conjunction with state and private sector support, have funded adolescent health care clinics in rural health departments. These projects have included nutrition services.[23] MCH SPRANS grants have supported adolescent health projects in South Carolina.[24] One project expanded reproductive health education curricula, including nutrition, targeted to seventh and eighth grade students in rural high-risk counties. Another project provided a comprehensive approach to promoting child and family health, including the establishment of a health promotion program in targeted county schools and a comprehensive school health education program in three public school districts. A SPRANS grant has supported the Transitional Adolescent Diabetes Program at Riley Children's Hospital in Indianapolis. This interdisciplinary demonstration project provides developmentally appropriate diabetes care to young adolescents and their families. The clinic serves as a training site for residents in pediatrics and internal medicine and for clinical research on transitional issues.[24]

The Domestic Volunteer Service Act funded ACTION Mini Grants in 1987 to address problems of adolescent parents and pregnant teenagers and their families as well as to provide drug abuse education.[25]

Office of Substance Abuse and Prevention, Alcohol, Drug Abuse and Mental Health Administration (ADAMHA), funds have provided grants on prevention, early intervention, and treatment of substance abuse in high-risk youth.[8]

Title XX, Adolescent Family Life Act Program Office of Population Affairs, has supported community-based programs to prevent adolescent pregnancy and provide comprehensive, coordinated health education and social services to teen age mothers and their babies.[26]

The Robert Wood Johnson Foundation has provided grants to public or nonprofit private institutions for 19 comprehensive school based clinics in 15 cities.[27]

The Cities in Schools Foundation, a nonprofit organization devoted to dropout prevention, has utilized private and public funds to promote human services, job training, and local employment opportunities for adolescents.[28]

The Kaiser Family Foundation Health Promotion Program has funded a project in California to decrease cardiovascular disease, cancer, substance abuse, adolescent pregnancy, and injuries.

Sources of Information on Funding Resources

Important sources of information for those looking for funding include the following:

- *Locating Funds for Health Promotion Projects,* Office of Disease Prevention and Health Promotion (ODPHP).[25] National Health Information Center, P.O. Box 1133, Washington, DC 20013-1133. (800) 336-4797/(301) 565-4167.
- *The Nutrition Funding Report: A Monthly Guide to Locating Resources.*[29] 607 Fourth Street, S.W., P.O. Box 75035 (mail only), Washington, DC 20013.
- *The Federal Register.* 1100 L Street, Washington, DC 20036.
- *The Catalog of Federal Domestic Assistance,* Office of Management and Budget. Government Printing Office, 710 N. Capitol Street, Washington DC 20401. Stock #922-009-00000-7. $38.00
- *Federal Health Information Clearinghouses,* ODPHP National Health Information Center. P.O. Box 1133, Washington, DC 20013-1133. (800) 336-4797/(301) 565-4167.
- The Foundation Center libraries. The Foundation Center, 1001 Connecticut Avenue, N.W., Washington, DC 20036.
- Nutrition personnel of the U.S. Public Health Service and the U.S. Department of Agriculture can provide information

on federal support applicable to nutrition services. U.S. Public Health Service, U.S. Department of Health and Human Services, 5600 Fishers Lane (HFN-88), Rockville, MD 20857. (301) 443-3170. USDA, Food and Nutrition Services, 3101 Park Center Drive, Alexandria, VA 22302. (703) 756-3284.

Aggressive action to identify and utilize all potential, although not necessarily labeled, nutrition resources is essential to the development and expansion of nutrition programs. Useful activities include identifying contacts to provide timely information on possible funding opportunities, identifying staff with an interest in and an ability to write grant applications and allowing work time for this activity, cooperating with other disciplines and agencies to assure appropriate nutrition services in grant applications relating to health priorities broader than nutrition, building relationships with voluntary organizations and service clubs to utilize their resources effectively for public health nutrition-related activities, utilizing third-party reimbursement more effectively, cooperating with private industry health-related community activities, and utilizing all available and appropriate training resources. Since many policy decisions are now made at the state level, it is essential for nutritionists to work with state agencies to take advantage of all possible resources for nutrition services.

Issues and Recommendations

The issues in financing nutrition programs and services range from national/state/organizational to individual practitioner concerns. National/state/organizational issues include but are not limited to:

- Limited input from the nutrition community regarding the development of health and social or human service legislation and policy.
- Inadequate promotion of nutrition services in all federal and state health and health-related programs.
- Lack of recognition by all health professionals of the relevance of nutrition to health and health care, resulting in a limited nutrition advocacy group.
- Lack of nutrition-related cost data to utilize in making national health care decisions or to adequately show cost-effectiveness and cost-benefit of nutrition services.
- Inadequate national and individual leadership to take full financial advantage of opportunities such as *The Surgeon General's Report on Nutrition and Health*[30] and the greatly increased interest in nutrition.
- Lack of identification of nutritionists/dietitians as recognized providers of care in some states.
- Inadequate dissemination of information on potential or actual resources for nutrition.

Individual practitioner issues include but are not limited to:

- Lack of knowledge of methods of financing nutrition services, including all available sources of support.
- Lack of knowledge of how to access essential information on a timely basis to obtain financial resources.
- Inadequate vision to see opportunities for supporting nutrition services as a part of a broader health or social program.
- Lack of ability to access or effectively participate in intra- and interagency planning/policy-setting groups at the national, state, or local level.
- Inability to effectively outreach to private resources or to change agency policy to be able to utilize private resources.

- Lack of training and experience in grant application writing.
- Inadequate marketing, coalition building, and advocacy skills.
- Inadequate skills in utilizing resources to obtain additional resources, such as utilizing state funds to obtain additional federal or other grant funds and allowing staff time to write grant applications.

Recommendations related to national/state/organizational issues include:

- The nutrition community and its leadership should be involved in the development of all nutrition, health, and human service legislation at national and state levels that can provide or that allows for nutrition services, programs, or activities.
- Nutrition leadership at national, federal, and state levels should actively promote nutrition services in all relevant health and health-related programs.
- State nutrition leadership should work closely with the State Medicaid programs to assure that registered dietitians are recognized Medicaid/EPSDT providers.
- Nutrition content should be included in the curricula for all health professional training programs.
- Activities should be developed and funded to obtain essential nutrition cost data for use in national health care discussions.
- Nutrition studies on cost-effectiveness and cost-benefit should be supported.
- National and state nutrition leadership should develop plans to be able to take full financial advantage of opportunities focusing a national spotlight on nutrition and/or diet, such as the National Academy of Sciences' committee report on *Nutrition During Pregnancy*,[31] the Year 2000 Objectives, etc.
- National, state, and local leadership should establish plans and mechanisms for harnessing the public interest in nutrition for the development of nutrition resources.
- National, federal, and state leadership in health and nutrition should take a more aggressive role in dissemination of information on potential and actual resources for nutrition activities.

Recommendations related to practitioners include:

- Training in methods of financing nutrition services, including knowledge of sources of public and private support and how to access this support, methods of accessing information on a timely basis, and grant application and contract writing, should be strengthened in existing curricula and be provided through continuing education programs.
- Training and continuing education should provide content and practical experience to enable nutritionists to access and function effectively on inter- and intraagency planning and policy groups.
- Training and continuing education of nutritionists should include content and skill building in marketing, coalition building, advocacy, and resource utilization.
- Individual nutritionists must be more assertive in identifying and participating in appropriate continuing education programs and in developing their own skills in financing nutrition services.
- Clinical nutritionists must develop and utilize effective counseling skills and document nutrition-related patient outcomes to demonstrate to third-party reimbursers the cost-effectiveness of nutrition services in order to retain recent gains in reimbursement for nutrition services.

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Economic Analysis of Nutrition Care Within Maternal and Child Health Services

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The goal of having information about the costs and benefits of nutrition care for the populations served by maternal and child health programs is to make the best use of resources to address their health needs. As any purchaser of goods or services, decision-makers want assurances that they are getting their money's worth. They want to know the potential return on their investment. Costs are clearly stated during the budget process. The benefits, however, are often ambiguous or unknown. Over the past ten years, nutrition practitioners have increased their efforts to evaluate their services in terms of economic return and provide the information needed by those who make decisions about investing resources in nutrition services.

The objectives of this chapter are to (1) explore the economic information needs of decision-makers, (2) review the process of policy analysis, especially from the economic perspective, and (3) discuss the relationships between a system of quality nutrition care and economic benefits. Examples will be included for illustration; however, the results of cost-benefit and cost-effectiveness studies will not be reported here, as they have recently been reviewed elsewhere[1] and are included in earlier chapters of this document.

Decision-Makers' Information Needs

Decision-makers who are responsible for making wise choices about expending available resources are repeatedly confronted with the question "Is this health procedure, service or program worth doing compared with other things we could do with the same resources?"[2] If they are to be convinced that money should be invested in nutrition services rather than used for another purpose, they need to know the value of nutrition services. This will allow them to compare nutrition care with other services such as physical therapy. Providing the decision-makers with evidence of the value (benefits) of nutrition services provided by dietitians and nutritionists can assist in the important negotiation of who will provide the services. These negotiations may result, for example, in nurses delivering nutrition services for women and children with low-risk nutrition problems and nutrition practitioners delivering nutrition services for those assessed to be high risk.

The critical need for this information in today's environment is evident in the proposal made by the Health Care Financing Administration to use the cost-effectiveness of a service as a criterion for reimbursement through Medicare.[3] The administration wants assurance that the cost of providing each service will be offset by the savings that will occur from making it available. This proposal is likely to be adapted by Medicaid and other payers. This is the key issue for all decision-makers who are accountable to their constituencies, whether they are legislators, regulators in the public sector, or private sector managers.

In both the public and private sectors, decision-makers are asking for information about nutrition services. They do not have the information they need to consider nutrition services as integral components of reimbursable care. They need to know what is included in this care and who the providers may be.[4, 5] They may assume that nutrition services are provided by physicians and are therefore covered under standard medical care financing mechanisms. Figure 14.1 identifies questions decision-makers have asked when approached about including nutrition care services in reimbursement policies.

The Decision-Makers

Planners, providers, consumers, and payers all make choices about nutrition care,[2] and it is up to the nutrition community to provide the information they need to make these decisions.[8] Practitioners have been responding to this charge with an increasing number of studies reporting the costs and the benefits of nutrition care for mothers and children, but there is still much more to be learned.[1] There are never sufficient resources to include all elements of service; choices always have to be made. "When information is lacking choices are made on the basis of 'gut feelings,' 'what has been done before,' and 'educated guesses.' "[2] If luck plays a role, these methods may work, but when billions of dollars are involved, 'educated guesses' and 'luck' should not be the primary factors used in making such decisions.

Planners

Planning takes place at two levels: societal and organizational. Societal planning establishes national and state policies, while organizations plan for daily activity with individuals. Economic information is needed for both societal and organizational planning. While there is some overlap, the basic economic information needed is different.[9]

Planners, working in regulatory agencies and as legislative staff, analyze numerous proposals each year and subsequently advise key public decision-makers.[10] Financial constraints are driving factors for the decision-making process in all organizations; therefore, costs and benefits are universally incorporated into the analyses. Nutritionists need to provide information about the economic value of nutrition services when working toward the development of maternal and child health services.

Providers

Physicians and administrators often are responsible for planning health and medical care at the organizational level. They are concerned with the quality of care offered to the consumer as well as the financial stability of the organization itself.

Figure 14.1: Questions decision-makers ask about nutrition services[5-7]

1. What services are provided?
2. How many clients require nutrition services?
3. How are nutrition services provided?
4. Who is the best provider of nutrition services? What are the training and qualifications of the providers?
5. How many visits will be necessary to improve the client's health?
6. How much will these visits cost?
7. How likely is it that the clients will make the desired change?
8. Will the clients' health improve?
9. Will the clients become more productive?
10. What other treatment costs will be saved by offering nutrition services?

Physicians, as the primary providers of health and medical care, influence the decisions made about nutrition services. The choice of whether or not to incorporate nutrition services, and the degree to which nutrition care is included, are often decided by physicians. Frequently they also decide who shall deliver nutrition care: the physicians, as a component of medical care; the nurses, in their overall health education role; or the dietitians and nutritionists who are the food and nutrition specialists.

The role of administrators, on the other hand, is to maximize income and oversee its distribution for the greatest benefit of the organization. Public administrators are often expected to use private sector principles and sell services at market prices. However, few public agencies are in a position to do so;[11] services of public agencies, like those of public health clinics, cannot be sold to the public at market prices. Most administrators recognize the importance of nutrition care for mothers and children, but they are faced with a lack of resources to provide all of the desirable services. Most dietitians and nutritionists lack the information necessary to influence administrators to invest some of these limited resources in nutrition care services.[1]

Nutrition program managers make decisions about how the limited resources allocated for nutrition care will be spent. Like the administrators mentioned above, these managers are expected to produce maximum benefits with respect to the goals of the organization. While these individuals inherently value nutrition services more highly than do other managers, insufficient funds force difficult decisions. Economic information is essential for these managers to make the most efficient use of the available resources.

Payers

All payers, whether consumers as first-party payers, providers or organizations as second-party payers, or public and private insurers as third-party payers, are concerned about getting the greatest return for their money. During the last 10 years, first-party payments have been increasing due to reductions in second- and third-party coverage. Individuals pay higher copayments and have experienced other increases in out-of-pocket fees. The implementation of Medicare's prospective payment system, commonly known as the Diagnosis-Related Group (DRG) system, has reduced the income of hospitals and made it more difficult for them to cover the cost of ancillary services. As a result, nutrition services have often become charge items shifting the cost to the first- or the third-party payers.

Third-party payers in both the public and private sectors are paying the bulk of the charges for medical care and preventive health care in the United States today. They are working tirelessly to find ways to reduce this burden. The prospective payment system has been successful, and similar systems are being developed for ambulatory care. Private insurance companies tend to follow the lead of the federal government, and many have already adjusted their payment mechanisms to a prospective type of system.

Capitation systems for health care, such as prepaid group practices and the health maintenance organizations, have increased in popularity within the past 10 years because they are providing medical care with greater cost-efficiency, thereby reducing costs.[12] Nutrition practitioners need to ensure that their services are included in these systems.

If nutrition services are to be included in an insurance package for prenatal and pediatric care, the nutrition practitioner must convince the corporate purchaser that the return on the dollar is worth the investment. When dietitians have discussed nutrition services with insurance company representatives and corporate benefit managers, they find the need to go back to the beginning; the managers do not know who dietitians are, what is included in nutrition care services, or what the needs are for nutrition care.[4, 5]

Dietitians and nutritionists have been working to understand reimbursement policies.[13] In addition, practitioners have been urged to emphasize the benefits and to help decision-makers integrate the benefits of nutrition services into their thinking.[14]

Consumers

Rashi Fein, a noted economist, reminds us that the question is not about resources and dollars: "It is really about people, about 239 million Americans, healthy and sick, rich, middle-income and poor, young and old."[15] In the context of this paper, it is about the benefits and costs of nutrition care and how people gain access to this care. Consumers are increasingly interested in nutrition. They are interested in the potential benefits nutrition can provide for staying healthy as well as for treatment and rehabilitation. Consumers are buying nutrition information at unprecedented rates by purchasing books, supplements, weight reduction systems, and cholesterol education programs. Women are seeking nutrition information on pregnancy, and parents want to know about feeding their children. Before they spend their money, however, they want to know how this information will help them achieve their goals. Therefore, it is important for the nutritionist to be able to respond with cost-effectiveness information in terms meaningful to consumers.

Whenever possible, the consumer wants someone else to pay for the service. Therefore, consumers will choose health insurance packages that provide the greatest coverage for the least cost. Employees and their representatives, such as unions, place demands for specific types of coverage; when they demand nutrition services from registered dietitians and licensed nutritionists, benefit managers are more likely to respond. To date, the demand has been limited.[5]

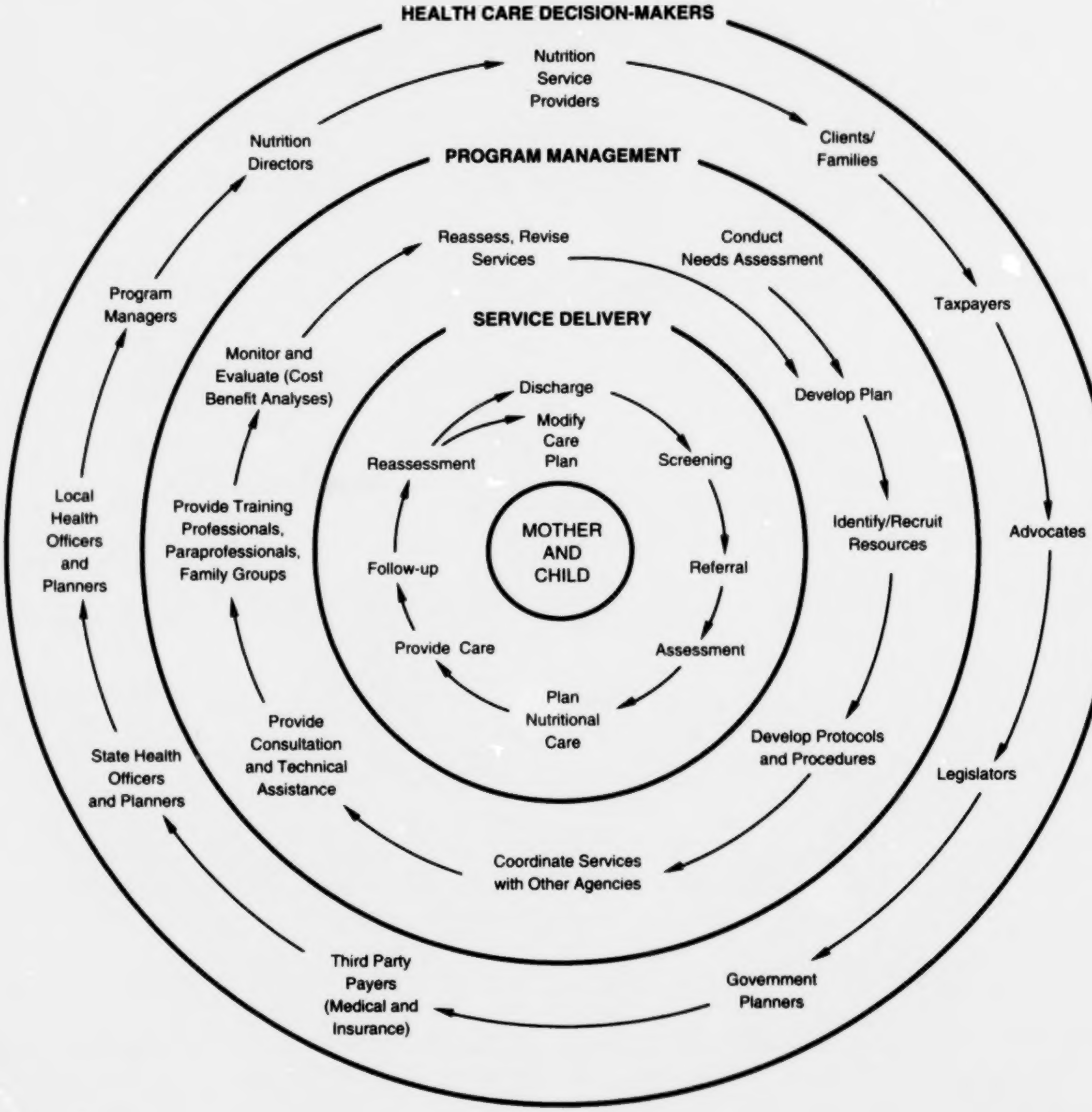
Figure 14.2 was adapted from M. T. Baer[16] to clarify the relationships between the target population, service providers, program managers, and key decision-makers who influence the financial support for nutrition services. Individuals who make decisions regarding the funding of health care services have biases toward certain outcomes or benefits.[17] The diagram shows how decision-makers may be influenced by the target population and the public (taxpayers) to facilitate reimbursement. It also demonstrates the vulnerability of mothers and children as they attempt to work through layers of organizational structure to acquire access to health services. Nutrition practitioners and program managers appear to be in a better position to influence the fiscal decisions, but their efforts are thwarted if they do not have information.

Consumers, health care providers, corporation managers, public health planners, and program managers all play a role in the decision to support nutrition care for mothers and children. Economic evaluations of nutrition services are needed to respond to the information needs of all of these decision-makers.

Economic Evaluations

Economic analyses provide information for decision-makers to use when making choices about the allocation of resources. These resources may be defined in terms of staff, space, equipment, travel, and other types of expenses necessary to carry out a nutrition service. The analyses systemati-

Figure 14.2: A system for nutrition services based upon the decisions of key individuals


HEALTH CARE DECISION-MAKERS
Nutrition Service Providers
Clients/ Families
Taxpayers
Advocates
Legislators
Government Planners
Third Party Payers (Medical and Insurance)
State Health Officers and Planners
Local Health Officers and Planners
Program Managers
Nutrition Directors
PROGRAM MANAGEMENT
Conduct Needs Assessment
Develop Plan
Identify/Recruit Resources
Develop Protocols and Procedures
Coordinate Services with Other Agencies
Provide Consultation and Technical Assistance
Provide Training Professionals, Paraprofessionals, Family Groups
Monitor and Evaluate (Cost Benefit Analyses)
Reassess, Revise Services
SERVICE DELIVERY
Discharge
Modify Care Plan
Screening
Referral
Assessment
Plan Nutritional Care
Provide Care
Follow-up
Reassessment
MOTHER AND CHILD

cally evaluate the inputs, or costs, required for the program or service and the consequences, or benefits, of the same activity. With this information, choices can be made between alternative ways to use the resources available in the health care sector.[2, 8, 18]

Cost analysis may be useful and can be applied to the four types of economic analyses: cost-minimization, cost-effectiveness, cost-benefit, and cost-utility. All contribute related but different kinds of information to use in establishing payment policies.[2]

Cost analysis

Cost analysis is the compilation of costs required for the many components of nutrition services. The various elements of nutrition care are identified, and the cost attached to each one is valued. The analysis of costs provides useful information but is only one part of the economic evaluations. These costs can be expressed as a total cost for the service, the cost for particular components of the service, the average cost per person served, or the average cost of achieving each desired outcome.[19]

Cost-minimization analysis

The result of a cost-minimization analysis is the identification of the least costly method of achieving the desired result. For example, if we assume that the results of nutrition services provided in a prenatal clinic by a nutrition team (paraprofessional nutrition aide and part-time nutritionist) would be the same as the results achieved by a full-time nutritionist, cost-minimization would identify the least costly alternative. It may be expressed as the average cost of providing each option. A note of caution: The assumption that the methods being examined will result in the same outcomes often does not hold.

Cost-minimization is not useful when the outcomes are not known or are known to be different.[2] In these cases, cost-effectiveness analyses are preferred because they measure both the accomplishments and the costs.

Cost-effectiveness analysis

First, for cost-effectiveness analysis, a desired outcome must be specified. At least two approaches are compared as to their levels of success at reaching the desired outcome as well as regarding their costs. For example, Splett et al.[20] used the recommended weight gain for each pregnant woman as the outcome and the measure of effectiveness. Two different practice settings within the same community were compared in the Splett study. The findings were $231 per woman achieving the recommended weight gain at the city health department and $170 per woman at the county hospital. In this example, the results are presented in terms of the cost per unit of achieved outcome, but they could also be presented in terms of the effect per unit of cost.

Presenting the results as the cost per unit of achieved outcome can be especially useful if it is important to estimate how much can be accomplished for a particular size budget. Therefore, restating the results reported by Splett et al.,[20] for each dollar applied in the health department, 0.0043 women could be expected to achieve the desired prenatal weight gain, versus 0.0059 women per dollar spent at the hospital. Based on this analysis, a $100,000 investment would result in 430 women or 590 women achieving their recommended weight goals if the money were used at the health department or at the hospital, respectively.

Cost-effectiveness requires that the outcomes being measured be the same. A nutrition manager, for example, may need to decide whether to invest the $100,000 in nutrition services for pregnant women or in services for infants. In this case, cost-effectiveness would not be a useful method of analysis, because the measures of outcome would need to be different. When there is no common outcome, cost-benefit analysis is the analytical method of choice.

Cost-benefit analysis

In cost-benefit analysis, both the benefits and the costs are expressed in dollar terms. The comparison is between dollars expressed as benefits and dollars expressed as costs; therefore, choices can be made about services with totally different objectives. Suppose the analysis is to assist in the decision to use money to pay for nutrition care for pregnant women or for children with phenylketonuria (PKU). Both are recognized to be critical areas for nutrition intervention, making the choice exceedingly difficult.

Orstead et al.[21] reported a 4 percent rate of low birthweight babies when pregnant women received in-depth nutrition care, compared to an 11 percent rate with limited care. Applying these results to the 590 women expected to achieve their recommended weight gain if they receive quality nutrition care,[20] we might predict that 27 (4 percent) would have low-birthweight babies. On the other hand, if the money were applied to serve the PKU group, 65 (11 percent) of the women would be expected to have low-birthweight babies.

In this example, the measure of benefit is the potential savings from reduced use of neonatal intensive care units (NICUs). The dollar value of each admission to an NICU was $17,000 (authors' adjustment to 1987 dollars).[22] The investment of the $100,000 for the prenatal nutrition intervention could be projected to save $646,000. (Sixty-five babies minus 27 babies equals 38 fewer low birthweight babies needing NICU care. Thirty-eight babies who did not need an NICU times $17,000 per admission equals $646,000 that was not spent on NICU care.) The benefit-cost ratio in this example, then, is 6.46:1 ($646,000 divided by $100,000). In this example, for each dollar spent on the nutrition care of the pregnant women, $6.46 in savings was estimated.

Since these results are to be compared with nutrition services for the infants and children diagnosed with PKU, a similar analysis needs to be carried out for that group. Phenylalanine levels between 2 and 10 mg/dl have been recommended for appropriate mental development and mental functioning.[23–26] A Utah study found a positive correlation between the children's phenylalanine levels and the number of contacts with the nutritionist.[27] The cost of providing nutrition services, including special food products, for 30 clients in 1987 in Utah was found to be $80,013, or $2,667 annual cost per client. Dietary treatment is required for each child or severe mental retardation results, which requires lifelong institutionalization. Between $12,000 and $25,000 for each client is saved annually by preventing this need for constant care. If the midpoint of $18,500 is used to estimate the annual benefit per client, then the benefit-cost ratio ($18,500/$2,667) is 6.94:1.[28]

These examples have been simplified to measure the value of only one benefit; in reality, there are many more. Some costs cannot be measured in dollar terms, such as the grief a family experiences from having a high-risk baby or a child with a lifelong chronic disease. Likewise, the benefits, or the avoidance of having the experience, cannot be valued in dollar terms. However, these costs and benefits are very real and very great to those who experience them.

Cost-benefit analysis, in theory, provides information for a comparison of costs and benefits from one type of program or service. Carrying the example through, a decision-maker attempting to get the greatest return for the $100,000 investment can compare two programs having very different outcomes. In theory, the choice would favor nutrition care for the PKU population; however, the decision does not have to be between one program and another. The best results would probably come from a combination of the two. In other words, maybe the best return would be achieved from $66,000 in the prenatal nutrition program and $33,000 in the PKU program. Many issues need to be considered when difficult choices like these are made. Cost-benefit analysis cannot provide all the answers, but it does contribute information about the degree of cost and expectation of results.

Cost-utility analysis

Cost-utility analysis is more difficult to carry out, and no nutrition example has been found in the literature. *Utility* is an economic term meaning the desirability or value placed on a product or service. In the health sector, *utility* refers to the value placed on a particular degree of health, or the amount of improvement that can be attained in health status.[2] People could be asked to rank their preferences on a scale of 0 (death) to 10 (perfect health), and this would allow the expression of utility in quality-of-life terms rather than dollars. The results of a cost-utility analysis are usually expressed in the cost per quality-adjusted life-year. A cost-utility analysis could be applied to nutrition services when measuring the value of tube feeding, gastrostomy feeding, or oral feeding for children with cerebral palsy or cystic fibrosis, or who are suffering the long-term effects of traumatic injury. The cost of the feeding modality would be analyzed in terms of the quality of life related to the method. For some families, the cost per quality-adjusted life-year of oral feeding would be far too great to warrant the efforts. The complexity of food preparation and pre-feeding therapy, and the time required for spoon feeding, may be too much for the family to endure when tube feeding is simpler.

These various methods of analysis may be applied singly or in combination. The choice depends upon the information needed and the type of decision being made. Information from these analyses contributes to thoughtful decision making. There are occasional circumstances, however, when economics may not enter into the decision to provide nutrition care services. For example, in spite of the cost and the outcomes, dietary treatment must be provided for children diagnosed with PKU; it would be unethical not to do so. The analysis, in this case, is applied to the cost-effectiveness of the process by which nutrition care is delivered.

The Present State of Economic Knowledge About Nutrition

Nutrition is important for every population group and in the prevention and treatment of many diseases that affect the American people. While the number of cost-benefit and cost-effectiveness analyses related to health and medical care has been increasing,[18, 29] nutrition has not been included in many. Several studies have reflected the costs and the benefits of nutrition care, but methodological problems have limited their usefulness for policy purposes,[30, 31] and there are not yet sufficient studies to give direction to planners and policymakers.

Special Challenges for Economic Analyses of Nutrition Services

In addition to acquiring the ability to relate nutrition care to economics, six issues present challenges to the health professionals promoting nutrition care services to decision-makers. Three, outside the control of the professional group, are:

1. Services new to the reimbursement systems are perceived as adding to the cost of health care.
2. Studies must be designed to isolate the impact of nutrition care.
3. Money required to conduct economic evaluations is not available.

The additional three challenges result from disagreements within the nutrition profession:

1. Scientific evidence from which to develop standards of care is often unclear.
2. Conflicting values occur among dietitians and nutritionists.
3. The ability to use economic information in advocacy for nutrition services needs to be learned.

New services

New services are not wanted in this era of cost containment. While nutrition services have been available for many years, they are new to the reimbursement systems. No one wants to add to the cost of health care, and since there is limited information that assures outcomes and savings in other areas as a result of nutrition services, they are viewed as adding to the cost. Nutrition practitioners need information to demonstrate a position of being cost-saving or at least cost-neutral.

Nutrition care is an integral part of health care

It is difficult to design studies that can separate the effect of nutrition care from the effect of other services.[7] Nutrition services are integrated with other types of care, and this approach has intentionally been developed within the area of maternal and child health.[32] Medical care, nutritional care, and psychosocial care together have been found to provide a package that is effective in improving pregnancy outcomes.[33–35] The interaction effect of these various components would need to be controlled for in the analysis of data, and this has yet to be done.

Scientific evidence

Scientific evidence in nutrition continues to expand. The recommendations made in nutrition services change with the evidence, and many are unsure about the direction to take. Within the last twenty years, for example, the recommendations made to pregnant women about the amount of weight they should gain have changed at least three times. Standards therefore change, and some say we cannot measure the effectiveness of nutrition services when standards continue to change. The lack of consensus within the nutrition community has long been a problem.[7, 36] This disagreement causes confusion and consternation for policymakers, making it more difficult to advocate for nutrition care reimbursement.

Values, ethics and economics

The values of many nutritionists are challenged by decisions based on economics. For some, it is unethical to withhold services until the effectiveness information is known. They believe that nutrition services help women have healthier babies, and feel that is reason enough to make nutrition care available. In confronting this issue, Marvin Kristein, a noted health economist, has written, "Denying reimbursement for procedures which are not [known to be] effective nor efficient is not 'unethical.' "[29] Furthermore, it might be said that spending taxpayers' money on unproven services is actually more unethical.

Resources to economically evaluate nutrition care

The final challenge facing nutrition practitioners in all settings is the lack of resources to carry out the studies.

Designing, implementing, and analyzing a study to measure the effectiveness and the cost of a service is time consuming and takes specialized knowledge. A few, like the nutrition services unit within the Utah Department of Health,[28] have been fortunate to acquire additional funding to conduct these studies, but most have to add this task to the duties of staff who already are working at their maximum.

Economic advocacy

Nutrition practitioners are not prepared to advocate for nutrition services on the basis of economics. Policymakers need to be educated on the relationship of nutrition to the economic health of mothers and children and the nation.[37] Nutritionists also need to inform these decision-makers about the consequences of their decisions about health, education, housing, agriculture, food processing and distribution, trade, national and state finances, taxation, and budgets.[36] All of these issues may impact on the health of the populations served and the care provided by maternal and child health programs.

These six challenges need to be recognized by all concerned with the development and use of economic information related to nutrition. They are challenges to be considered, barriers to be overcome, but not monsters to be avoided. They need to be faced and confronted.

Analyzing the Benefits of Nutrition Care

The benefits of nutrition services are measured by the savings achieved from better health through improved diet and nutrition status. Effectiveness is measured by the degree to which anticipated health improvements are achieved through a particular intervention.[37] In order to measure the effectiveness of nutrition services, five preliminary steps are required.

First, specific objectives for the service must be identified and expressed in health terms. These objectives must be based on explicit criteria, measurable, and directly related to improved health (e.g., pounds gained or lost, units of blood glucose or glycosylated hemoglobin decreased, units of hemoglobin or hematocrit increased, or units of blood pressure reduced).[2, 38] In a study which measured the effect of nutrition care on reducing iron deficiency anemia in young children, the criterion used for anemia was a hemoglobin measurement of 11 gm/dl or less.[39] This was a very specific, measurable objective based on a medically accepted criterion that is related to the health status of young children.

The second step is the development of standardized protocols. Many of these are readily available through the work nutrition professionals have done in the area of quality assurance. Quality assurance standards have been developed for the maternal and child population groups and the primary health conditions requiring nutrition care.[40, 41]

Once the standards are agreed upon, the third step is the development of protocols and procedures for the delivery of nutrition care.[42] Protocols allow nutrition services to be consistent from provider to provider and site to site. Measuring the effectiveness of nutrition services requires uniformity in the services offered and the manner in which the professionals conduct themselves. In the anemia example described earlier,[39] the procedures for the nutrition services were standardized. The dietary assessment protocol called for a 24-hour recall. Individual counseling for parents and guardians included meal planning, food purchasing and preparation. The subject matter to be taught in group education activities was delineated.

Fourth, routine documentation of improved health must be made. Changes in indicators such as hemoglobin levels must be recorded in a permanent record, ideally a medical record, to permit evaluation of the health status.[43] In addition, documentation of the process by which results were achieved is important. In 1982, it was reported that the greatest problem in demonstrating the cost-benefit and cost-effectiveness of nutrition services was the lack of documentation.[42]

Fifth, a system should be in place to compile the data and compare the results with other methods of achieving the same health objective.[38] Examine the successes and analyze the areas in need of improvement, and then revise the protocols as necessary to improve the outcomes.

Once these five steps are in place, practitioners will be prepared to measure the effectiveness of nutrition services. The knowledge gained by measuring the outcomes can be used to justify nutrition services to local administrators and to state and federal policymakers. In the event that the desired outcomes are not achieved, these results can be very valuable in the revision of services, and in making improvements in outcomes.

Measuring the Costs of Nutrition Care

Nutrition practitioners often equate the cost of nutrition care with the charges. This may cause a problem in reporting information about costs and may limit the effectiveness of advocating for support. Charges are not useful proxies for costs when the analysis is conducted from the societal perspective.[18] Charges also may not be sufficient for use in negotiation for reimbursement rates. In 1986, dietitians in California were asked by MediCal (California's Medicaid system) representatives to recommend an appropriate reimbursement rate for nutrition care services for low-income pregnant women. A quick telephone survey to 25 dietitians provided information only on charges made and no information on the costs. MediCal officials were willing to negotiate regarding actual costs to ensure a fair payment but would not negotiate regarding charges. Therefore the dietitians were unable to affect the reimbursement rate, and it was based on the cost figures provided by other disciplines.

Cost is the measure of resources used in the provision of nutrition care. The first step, therefore, in measuring the cost of nutrition services is to identify the resources needed to deliver the care. Personnel, equipment, materials for assessment and education, food products, office space and supplies, and travel are the primary categories of cost, but there may be others depending on the method of service delivery.

Specific methods of measuring cost have been described elsewhere[17, 44, 45] and need not be detailed here. Two notes of caution, however, need to be made. First, accounting costs and economic costs may be defined differently, and this needs to be clarified in the design of an analysis. Especially confusing are the definitions and methods used to measure and value "indirect costs." Second but related to the first note is the recommendation made to take the percentage of "direct costs" as a measure of "indirect costs." This should not be done arbitrarily, but only after a cost analysis has been completed for a particular practice setting. Once a careful analysis is made, the percentage can be calculated and then, when appropriate, applied. But all too often, the percentage is not based on any factual information, but instead is a number drawn from the hunches of administrators or accountants. Using this type of information can produce unreliable and misleading results in the cost side of the equations.

Economists repeatedly warn health professionals who tackle economic analyses of the problem of valuing costs that occur at different periods of time.[2, 18] The technique of discounting is used to make these adjustments and must be considered when the program or service is being evaluated over a period of years. Discounting has been discussed[2, 18] and the analytical methods described.[45–47]

Having data about the resources needed will be useful, once the effectiveness of the service is determined. As Simko and Conklin stated, ". . . Precise calculation of program costs will be moot unless there is documentation of program effectiveness. No expenditure of resources is justified for a program that fails to achieve its intended outcome."[38]

Reporting the Results

Once the cost-effectiveness or the cost-benefit of nutrition services is known, it is important for nutrition practitioners to use the results and make specific recommendations. It cannot be assumed that the decision-makers will understand the significance of the findings; most legislators, for example, have legal training but limited knowledge about health care. They need to learn about nutrition and nutrition care services from dietitians and nutritionists. The majority of planners and policymakers do not have sufficient understanding of nutrition services to fully comprehend the application of nutrition service evaluations to policies of the health delivery system. It is up to the nutrition professionals to interpret and disseminate the information learned from economic analyses.[38, 45]

The limitations of the economic information must also be recognized. Cost-effectiveness and cost-benefit information is not perfect; it has limitations on both sides of the equation.[3, 18] It does provide more information for decision-makers to use, but in the end, judgment is needed. Negotiation, political compromise, and consensus development will continue to play an important role in the policymaking process, but statements about the effectiveness and efficiency of nutrition care services can be used to influence the decisions.

Summary

Information about the costs and benefits of nutrition programs and services for mothers and children is beginning to accumulate, but there is much more to be learned. Several approaches to economic analysis can be applied and the results used to influence decisions made in health care policy for maternal and child populations. It is up to nutrition professionals to compile the information and use it to justify and advocate for nutrition services.

Issues and Problems

1. It must be understood that having economic information does not guarantee funding or reimbursement for nutrition services. It makes an important contribution to the decision-making process, but other factors may have a greater influence at a particular point in time.

2. Timing is important. Having the information available to use at the opportune moment is critical.

3. Many nutritionists and dietitians do not have the ability to communicate with the people who determine financial policies. The nutrition experts need to become fluent in the issues of concern to the financial decision-makers and become effective in promoting the benefits of nutrition services.

4. Most nutritionists and dietitians do not have the knowledge necessary to design and implement economic evaluations of their interventions.

5. Resources are insufficient to conduct cost-benefit and cost-effectiveness studies within a service delivery setting. Therefore, efforts tend to be made on a reactive basis when decision-makers plan to cut budgets.

6. Available cost-benefit and cost-effectiveness information needs to be interpreted and disseminated by nutrition practitioners to the medical care community, policymakers, and consumers.

Recommendations

1. Information available currently needs to be compiled and systematically updated in such a way that nutritionists and other health professionals promoting nutrition care services can use it readily in discussions with decision-makers.

2. Financial resources need to be made available for training MCH nutritionists in the use of available data and the methodologies necessary to conduct well-designed economic evaluations of nutrition care services.

3. Financial resources need to be made available for the support of economic evaluations of nutrition care services provided in MCH programs.

4. Identify key decision-makers at the federal, state, and local levels with whom to promote nutrition care services for maternal and child health programs; then organize and carry out the marketing plan.

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Appendixes

Workshop Program
CALL FOR ACTION: BETTER NUTRITION FOR MOTHERS, CHILDREN, AND FAMILIES

December 6-8, 1990
Georgetown University Leavey Conference Center
Georgetown University, Washington, DC

Thursday, December 6, 1990

8:00 am–5:00 pm Registration

8:30 am MCHING Planning Committee Pre-Workshop Meeting *Salon F*

10:00 am Workshop Leadership Training *Salon G*

1:00 pm Opening Plenary Session *Salon G*

Moderator
Vince L. Hutchins, M.D.
Acting Director
Maternal and Child Health Bureau

Welcome
Rochelle Mayer, Ed.D.
Program Director
National Center for Education in Maternal and Child Health

Harriet Cloud, M.S., R.D.
Chair, Workshop Committee
Maternal and Child Health Interorganizational Nutrition Group—American Dietetic Association

Goals and Objectives of the Workshop
Vince L. Hutchins, M.D.
Acting Director, Maternal and Child Health Bureau

National Trends, Needs, and Issues in Maternal and Child Health: Implications for Nutrition Services
The Honorable John D. Rockefeller IV
United States Senator
Chair, National Commission on Children

2:30 pm Break

Thursday, December 6, 1990
(Continued)

3:00 pm PLENARY SESSION Salon G

Moderator
Mary Story, Ph.D., R.D.
Chair, Background Papers Committee
Maternal and Child Health Interorganizational Nutrition Group—Association of the Faculties of Graduate Programs in Public Health Nutrition

Summary of Issues Identified in Background Papers
E. Ann Prendergast, R.D., M.P.H.
Chief Nutritionist
Maternal and Child Health Bureau

Reaction Panel
Frank Witter, M.D.
American College of Obstetricians and Gynecologists

Barbara K. Popper, M.Ed.
Federation for Children with Special Needs:
CAPP National Parent Resource Center

William J. Haskins
Vice President Programs, National Urban League

Charge to Work Groups
Mary Egan, M.S., M.P.H., R.D.
MCH Consultant
National Center for Education in Maternal and Child Health

4:30 pm FIRST SESSION OF WORK GROUPS

Women's Nutrition During the Reproductive Years A	*Salon E*
Women's Nutrition During the Reproductive Years B	*Salon D*
Infant Nutrition A	*Conference Room 1*
Infant Nutrition B	*Conference Room 2*
Child Nutrition A	*Conference Room 3*
Child Nutrition B	*Conference Room 4*
Adolescent Nutriton A	*Conference Room 5*
Adolescent Nutrition B	*Conference Room 6*
Children with Special Health Care Needs A	*Salon F*
Children with Special Health Care Needs B	*Salon B*

5:30–7:00 pm RECEPTION AND DISPLAY OF AGENCY/ORGANIZATION MATERIALS *Salon H*

Friday, December 7, 1990

8:00–9:00 am CONTINENTAL BREAKFAST

9:00 am PLENARY SESSION *Salon D,E,F*

Moderator
Agnes Hinton, M.S., R.D.
Association of State and Territorial Public Health Nutrition Directors

Building Coalitions
Lori Cooper
Healthy Mothers, Healthy Babies

9:45 am SECOND SESSION OF WORK GROUPS

Women's Nutrition During the Reproductive Years A	*Parlor Suite TBA*
Women's Nutrition During the Reproductive Years B	*Parlor Suite TBA*
Infant Nutrition A	*Conference Room 1*
Infant Nutrition B	*Conference Room 2*
Child Nutrition A	*Conference Room 3*
Child Nutrition B	*Conference Room 4*
Adolescent Nutriton A	*Conference Room 5*
Adolescent Nutrition B	*Conference Room 6*
Children with Special Health Care Needs A	*Salon F*
Children with Special Health Care Needs B	*Administrative Conference Room*

12:00 pm LUNCHEON *Salon G*

Moderator
Zsolt Koppanyi, M.D.
Association of Maternal and Child Health Programs

Dynamics of Change
David B. McCallum, Ph.D.
Deputy Director
Center for Risk Communication
Columbia University

2:00–5:00 pm THIRD SESSION OF WORK GROUPS
Same locations as listed above for second session of work groups.

Saturday, December 8, 1990

8:00-9:00 am	CONTINENTAL BREAKFAST	*Salon H*
9:00 am	PRESENTATION AND DISCUSSION OF WORK GROUP RECOMMENDATIONS *Moderator* Ellen Thompson, M.S., R.D. Association of State and Territorial Public Health Nutrition Directors	*Salon H*
10:30 am	BREAK	
10:45 am	PRESENTATION AND DISCUSSION OF WORK GROUP RECOMMENDATIONS (CONTINUED)	*Salon H*
12:00 pm	LUNCHEON	*Salon G*
1:30 pm	ORGANIZATIONS AND OPPORTUNITIES FOR ACTION *Moderator* M. Elizabeth Brannon, M.S., R.D. Director, MCH Training Programs Maternal and Child Health Bureau Panel Terry F. Hatch, M.D. Member, American Academy of Pediatrics Committee On Nutrition Richard P. Nelson, M.D. President, Association of Maternal and Child Health Programs Nancy Wellman, Ph.D., R.D. President, American Dietetic Association	*Salon H*
3:00 pm	ADJOURN	
3:00–4:00 pm	MCHING PLANNING COMMITTEE POST-WORKSHOP MEETING	*Salon H*

National Health Promotion and Disease Prevention Objectives Related to Maternal and Child Nutrition Services

The *Healthy People 2000: National Health Promotion and Disease Prevention Objectives* related to maternal and child nutrition services are listed below. The objectives are numbered to facilitate reference to the full report which includes baseline data and a discussion of each objective. The National Nutrition Monitoring and Related Research Act (Public Law 101-445, October 22, 1990) and the required 10-year coordinated plan required in the law should provide for the collection of data to monitor progress towards meeting these objectives.

Physical activity and fitness

1.3 Increase to at least 30% the proportion of people aged 6 and older who engage regularly, preferable daily, in light to moderate physical activity for at least 30 minutes per day.

1.4 Increase to at least 20% the proportion of children and adolescents aged 18 and older and to at least 75% the proportion of children and adolescents aged 6 through 17 who engage in vigorous physical activity that promotes the development and maintenance of cardiorespiratory fitness 3 or more days per week for 20 or more minutes per occasion.

1.5 Reduce to no more than 15% the proportion of people aged 6 and older who engage in no leisure-time physical activity.

1.6 Increase to at least 40% the proportion of people aged 6 and older who regularly perform physical activities that enhance and maintain muscular strength, muscular endurance, and flexibility.

1.8 Increase to at least 50% the proportion of children and adolescents in 1st through 12th grade who participate in daily school physical education.

1.9 Increase to at least 50% the proportion of school physical education class time that students spend being physically active, preferably engaged in lifetime physical activities.

1.12 Increase to at least 50% the proportion of primary care providers who routinely assess and counsel their patients regarding the frequency, duration, type, and intensity of each patient's physical activity practices.

Nutrition

2.3 Reduce overweight to a prevalence of no more than 15% among adolescents aged 15 through 19.

2.4 Reduce growth retardation among low-income children aged 5 and younger to less than 10%.

2.5 Reduce average dietary fat intake to 30% of energy or less and average saturated fat intake to less than 10% of energy among people aged 2 and older.

2.7 Increase to at least 50% the proportion of overweight people aged 12 and older who have adopted sound dietary practices combined with regular physical activity to attain an appropriate body weight.

2.8 Increase calcium intake so at least 50% of youths aged 12 through 24 consume 3 or more servings of calcium-rich foods daily.

2.10 Reduce iron deficiency to less than 3% among children aged 1 through 4 and among women of childbearing age.

2.11 Increase to at least 75% the proportion of mothers who breastfeed their babies in the early postpartum period and to at least 50% the proportion who continue breastfeeding until their babies are 5 to 6 months old.

2.12 Increase to at least 75% the proportion of parents and caregivers who use feeding practices that prevent baby bottle tooth decay.

2.17 Increase to at least 90% the proportion of school lunch and breakfast services and child care food services with menus that are consistent with the nutrition principles in *Dietary Guidelines for Americans.*

2.19 Increase to at least 75% the proportion of the nation's schools that provide nutrition education from preschool through 12th grade, preferably as part of quality health education in the school.

2.21 Increase to at least 75% the proportion of primary-care providers who provide nutrition assessment and counseling and/or referral to qualified nutritionists or dietitians.

Alcohol and Other Drugs

4.8 Reduce alcohol consumption by people aged 14 and older to an annual average of no more than 2 gallons of ethanol per person.

Educational and Community-Based Programs

8.4 Increase to at least 75% the proportion of the Nation's elementary and secondary schools that provide planned and sequential kindergarten through 12th grade quality school health education.

8.9 Increase to at least 75% the proportion of people aged 10 and older who have discussed issues related to nutrition, physical activity, sexual behavior, tobacco, alcohol, other drugs, or safety with family members on at least one occasion during the preceding month.

Oral Health

13.1 Reduce dental caries (cavities) so that the proportion of children with one or more caries (in permanent or primary teeth) is no more than 35% among children aged 6 through 8 and no more than 60% among adolescents aged 15.

13.9 Increase to at least 75% the proportion of people served by community water systems providing optimal levels of fluoride.

Maternal and Infant Health

14.1 Reduce the infant mortality rate to no more than 7 per 1,000 live births.

14.5 Reduce low birth weight to an incidence of no more than 5% of live births and very low birth weight to no more than 1% of live births.

14.6 Increase to at least 85% the proportion of mothers who achieve the minimum recommended weight gain during their pregnancies.

14.9 Increase to at least 75% the proportion of mothers who breastfeed their babies in the early postpartum period and to at least 50% the proportion who continue breastfeeding until their babies are 5 to 6 months old.

14.10 Increase abstinence from tobacco use by pregnant women to at least 90% and increase abstinence from alcohol, cocaine, and marijuana by pregnant women by at least 20%.

14.11 Increase to at least 90% the proportion of all pregnant women who receive prenatal care in the first trimester of pregnancy.

14.12 Increase to at least 90% the proportion of primary care providers who provide age-appropriate preconception care and counseling.

Chronic Disabling Conditions

17.20 Increase to 50 the number of States that have service systems for children with or at risk of chronic and disabling conditions, as required by Public Law 101-239.

Clinical Preventive Services

21.2 Increase to at least 50% the proportion of people who have received, as a minimum within the appropriate interval, all of the screening and immunization services and at least one of the counseling services appropriate for their age and gender as recommended by the U.S. Preventive Services Task Force.

21.4 Improve financing and delivery of clinical preventive services so that virtually no American has a financial barrier to receiving, at a minimum, the screening, counseling, and immunization services recommended by the U.S. Preventive Services Task Force.

21.5 Assure that at least 90% of people for whom primary care services are provided directly by publicly funded programs are offered, at a minimum, the screening, counseling, and immunization services recommended by the U.S. Preventive Services Task Force.

21.6 Increase to at least 50% the proportion of primary care providers who provide their patients with the screening, counseling, and immunization services recommended by the U.S. Preventive Services Task Force.

21.8 Increase the proportion of all degrees in the health professions and allied and associated health profession fields awarded to members of underrepresented racial and ethnic minority groups as follows:

Degrees Awarded To:	1985-86 Baseline	2000 target
Blacks	5%	8%
Hispanics	3%	6.4%
American Indians/ Alaska Natives	0.3%	0.6%

Note: Underrepresented minorities are those groups consistently below parity in most health profession schools—blacks, Hispanics, and American Indians and Alaska Natives

Surveillance and Data Systems

22.4 Develop and implement a national process to identify significant gaps in the Nation's disease prevention and health promotion data, including data for racial and ethnic minorities, people with low incomes, and people with disabilities, and establish mechanisms to meet these needs.

Adapted from Healthy People 2000: National Health Promotion and Disease Prevention Objectives.

Appendix A from the Fiscal Year 1992 Maternal and Child Health Services Title V Block Grant Program Application, Maternal and Child Health Bureau, Department of Health and Human Services is reprinted below.

Application

Maternal and Child Health Services Block Grant Program

Fiscal Year 1992

National Maternal and Child Health Objectives for the Year 2000

All of the objectives are either derived from or consistent with *Healthy People 2000: National Health Promotion and Disease Prevention Objectives.* Also all the national MCH objectives are clearly relevant to maternal and child health even though several of them call for action that must come primarily from other sectors of American society.

1. Increase to at least 90 percent the proportion of all pregnant women who receive prenatal care in the first trimester of pregnancy. (Component: A) *Data source:* State Vital Statistics natality data.

2. Reduce the maternal mortality rate to no more than 3.3 per 100,000 live births. (Component: A) *Data source:* State Vital Statistics mortality data.

3. Reduce the fetal death rate (20 or more weeks of gestation) to no more than 5 per 1,000 live births plus fetal deaths. (The data used to calculate this rate and the neonatal death rate in Objective 8 can be used to calculate the perinatal death rate.) (Component: A) *Data source:* State Vital Statistics mortality data.

4. Reduce to no more than 1 per 1,000 the prevalence of HIV infection among women giving birth to live-born infants. (Components: A, B, C) *Data source:* Center for Infectious Disease, Centers for Disease Control (CDC).

5. Reduce low birth weight (less than 2,500 grams) to an incidence of no more than 5 percent of live births and very low birth weight (less than 1,500 grams) to an incidence of no more than 1 percent of live births. (Component: A) *Data source:* State Vital Statistics natality data.

6. Increase to at least 90 percent the proportion of very low birth weight infants born in tertiary level (III) hospitals. (Component: A) *Data source:* State Vital Statistics natality data.

7. Increase to at least 95 percent the proportion of newborns screened by State-sponsored programs for genetic disorders and other disabling conditions and to at least 90 percent the proportion of newborns testing positive for disease who receive appropriate treatment (as measured by the proportion of infants served by programs for sickle cell anemia and galactosemia). (Component: A) *Data source:* Council of Regional Networks for Genetic Services; Association of State and Territorial Public Health Laboratory Directors.

8. Reduce the infant mortality rate (deaths of infants under 1 year) to no more than 7 per 1,000 live births. (Component: A) Type Specific Target: Reduce the neonatal mortality rate (deaths of infant under 28 days) to no more than 4.5 per 1,000 live births. Type Specific Target: Reduce the postneonatal infant mortality rate (deaths of infants from 28 days to 1 year) to no more than 2.5 per 1,000 live births. *Data source:* State Vital Statistics mortality data.

9. Increase to at least 95 percent the proportion of EPSDT eligibles who participate in the full complement of EPSDT services, including physical health, mental health, oral health, vision and hearing, all periodic screening as recommended by the American Academy of Pediatrics, and indicated periodic screening, and all needed diagnosis and treatment. (Components: A, B, C) *Data source:* State Medicaid agency.

10. Increase to at least 90 percent the proportion of children under age 2 who complete the basic immunization series. (Components: A, B) *Data source:* Center for Prevention Services, CDC; Center for Infectious Diseases, CDC.

11. Reduce the prevalence of blood lead levels exceeding 15 ug/dL among children 6 months through 5 years to no more than 2.5 percent. (Components: A, B) *Data source:* Agency for Toxic Substances and Disease Registry; State and local childhood lead poisoning prevention programs.

12. Achieve for all low-income children and children with disabilities access, in the preschool years, to appropriate and high quality early childhood development programs which meet established standards for health, safety, staff qualifications, adult/child ratios, and parent involvement. (Components: B, C) *Data source:* Family Support Administration, DHHS; Office of Human Development Services, DHHS.

13. Increase to at least 75 percent the proportion of all children who have attained appropriate weight for height to promote growth and development. (Component: B) *Data source:* National Center for Health Statistics, CDC

14. Increase to at least 90 percent the proportion of the Nation's elementary and secondary schools that provide a planned and sequential kindergarten

through grade 12 program of comprehensive school health education, resulting in demonstrated knowledge related to health matters, including awareness of the implications of risk taking behaviors. (Component: B) *Data source:* National School Boards Association; State and local education agencies.

15. Increase to at least 50 percent the proportions of children ages 8 and 14 who have received protective sealants on the occlusal (chewing) surfaces of permanent molar teeth. (Component: B) *Data source:* National Institute of Dental Research, NIH, State oral health needs surveys.

16. Increase to at least 95 percent the proportion of 9-year-olds reading at a basic level or higher. (Component: B) *Data source:* U.S. Department of Education.

17. Reverse to less than 25.2 per 1,000 children the rising incidence of maltreatment of children younger than age 18 (includes physical abuse, sexual abuse, emotional abuse, and neglect). (Components: A, B) *Data source:* National Center on Child Abuse and Neglect, OHDS

18. Reduce deaths among children and youth through age 24 caused by unintentional injuries by at least 15 percent (includes motor vehicle crash deaths among vehicle occupants, motorcyclists, bicyclists, and pedestrians; drowning deaths; and residential fire deaths). (Components: A,B) *Data source:* State Vital Statistics mortality data.

19. Reduce by 20 percent the incidence of physical fighting among adolescents aged 14 through 17 and reduce by 20 percent the incidence of weapon-carrying by adolescents aged 14 through 17. (Component: B) *Data source:* State Vital Statistics mortality data; National Center for Chronic Disease Prevention and Health Promotion, CDC.

20. Reduce suicides among youth aged 15 through 19 to no more than 8.2 per 100,000 youth and reduce by at least 15 percent the incidence of injurious suicide attempts among adolescents aged 14 through 19. (Component: B) *Data source:* State Vital Statistics mortality data; National Center for Chronic Disease Prevention and Health Promotion, CDC.

21. Reduce to no more than 30 percent the proportion of all pregnancies that are unintended. (Components: A, B) *Data source:* National Center for Health Statistics, CDC.

22. Reduce by at least 50 percent the use of tobacco, alcohol, marijuana, and/or cocaine among adolescents ages 12 through 17. (Component: B) *Data source:* National Center for Health Statistics, CDC.

23. Reduce by at least 30 percent the proportion of youth ages 12 through 21 who contract sexually transmitted diseases. (Component: B) *Data source:* State Reportable Disease Registry.

24. Reduce pregnancies among girls aged 17 and younger to no more than 50 per 1,000 adolescents. (Components: A, B) *Data source:* State Vital Statistics natality data.

25. Increase the proportion of youth who complete high school by age 19 to at least 90 percent. (Component: B) *Data source:* U.S. Census Bureau; U.S. Department of Education; State and local education agencies.

26. All states will establish a statewide network of comprehensive, community-based health care systems that serve women of reproductive age, infants, children, adolescents, and children with special health care needs; the systems will assure family-centered, culturally-competent, coordinated services. (Components: A, B, C) *Data source:* Title V program data.

27. All children from birth to age 21, including those with special physical or mental health care needs, will have a source of health care financing that includes comprehensive preventive, diagnostic, and therapeutic benefits. (Components: A, B, C) *Data source:* Title V program data; U.S. Census Bureau; Agency for Health Care Policy and Research, PHS.

28. Decrease the proportion of children and youth under age 18 living in poverty by at least 50 percent. (Components: A, B) *Data source:* U.S. Census Bureau.

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